Robinson's Shorter Course.

KEY

TO THE

COMPLETE ARITHMETIC,

FOR

TEACHERS AND PRIVATE LEARNERS.

IVISON, BLAKEMAN, TAYLOR & CO.,
NEW YORK AND CHICAGO.

ROBINSON'S

SHORTER COURSE.

FIRST BOOK IN ARITHMETIC. PRIMARY.
*COMPLETE ARITHMETIC. In One volume.**
COMPLETE ALGEBRA.

ARITHMETICAL PROBLEMS. ORAL and WRITTEN.
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* *This* COMPLETE ARITHMETIC *is also published in* TWO VOLUMES. *PART I. and PART II. are each bound separately, and in* CLOTH.

PREFACE

A KEY to any mathematical work is not indispensably necessary to many teachers, but with the multiplicity of duties ordinarily devolving upon the teacher, time cannot always be had to answer or solve all questions that may be presented by the pupil. Hence a *key* becomes a great convenience, if not a necessity, in lessening the labor, and saving the time of the teacher, by presenting the shortest solution, and the best form of analysis, as a standard to which the pupil should be required to conform.

As *this key* has not been prepared for the *pupil*, but for the *teacher* and *private learner*, solutions of all the oral, and of many of the easier written examples are not included, and the operations are much abbreviated, the partial or intermediate results being often omitted, and the processes, for the most part, indicated by signs.

KEY

TO THE

COMPLETE ARITHMETIC.

Article 113.

1. ($1500 − $960.90) × 3 = $1617.30, *Ans.*
2. ($53.62 − $46.45) × 7 = $50.19, *Ans.*
3. ($9.12 × 388) − $2709 = $829.56, *Ans.*
4. $5670 − ($7.25 × 365) = $3023.75, *Ans.*
5. 126720 − 108800 = 17920, *Ans.*
6. 23458 − 20580 = 2878, *Ans.*
7. 620 × 60 = 37200, *Ans.*
8. 542 × 279 = 151218, *Ans.*
9. $15760 − $8561.25 = $7198.75, *Ans.*
10. $3246 + $10938 + $4617 = $18801, whole;
    $10938 + $4617 = $15555, farm and stock.
11. ($184.50 × 48) − ($4.80 × 130) = $8232, *Ans.*
12. $1150 − ($9 × 125) = $25, loss.
13. 82050 − 5000 = 77050, *Ans.*
14. (97000 − 6000) + 1500 = 92500, *Ans.*
15. ($73.46 − $3.96) + $1645 = $1714.50, *Ans.*
16. $25592.32 + ($1759.50 × 10) = $43187.32, Ans.

Art. 145.

1. $(2712 \div 113) \times 205 = 4920$, *Ans.*

2. $2124 \div 236 = 9$, *Ans.*

4. $\overline{36+114} \times \overline{5640-3007} = 394950$, *Ans.*

5. $30128 \div (4200 \div 75) = 538$, *Ans.*

6. $\overline{204 \times 378} \div \overline{378-204} = 443\frac{30}{174}$, *Ans.*

7. \$30.76 − (\$12.36 + \$7.62) = \$10.78, *Ans.*

8. $(746 \times 23) - (18975 \div 25) = 16399$, *Ans.*

9. (\$3000 − \$925.60) − \$2046.25 = \$28.15, *Ans.*

10. (75 cts. × 1600) ÷ 40 cts = 3000 lb.

11. (\$3376.25 − \$638.75) ÷ 365 = \$7.50, *Ans.*

12. $170352 \div 4 = 42588$, *Ans.*

13. $(17605 \div 5) \times 204 = 718284$, *Ans.*

14. (\$133 × 28) ÷ (\$1500 − \$968) = 7 yr., *Ans.*

15. $166656 \div 3 = 55552$, *Ans.*

16. $12624 \times 4 = 50496$, *Ans.*

17. $43950 \div 6 = 7325$, *Ans.*

18. $91864 \times 9 = 826776$, *Ans.*

20. (\$.60 + \$.78 + \$.90) ÷ 3 = \$.76, *Ans.*

21. (\$104 + \$97 + \$128 + \$99 ÷ 4 = \$107, *Ans.*

22. (\$1500 + \$2976 + \$1895) ÷ 3 = \$2123⅔, *Ans.*

23. $\$487.20 \div (\$25 - \overline{\$8.75 + \$4.65}) = 42$ weeks, *Ans.*

24. (\$4578 − \$1642) ÷ 8 = \$367, *Ans.*

25. $(\overline{\$75 \times 86} + \overline{\$54 \times 54}) - \$7560 = \$1806$, *Ans.*

26. *\$6780 + \$8200* + \$8306 + (\$8306 − \$1345) = \$30247.

28. $(5672-1974)\div 2=1849$, *less, Ans.*

29. $(\$1250-\$190)\div 2=\$530$, *carriage, Ans.*

30. $(3789-227)\div 2=1781$ votes, U. C., *Ans.*

31. $(\$28475-\$4625)\div 2=\$11925$, *less* sum, *Ans.*

32. $(240\div\overline{5+10+15})\times 3=24$ boxes, *Ans.*

33. $(\$2492-\$1424)\div 3=356$ Cd.;
$\$1424\div 356=\$4$ cost, *Ans.*

34. $(\overline{269-3}\div 14)+37-48)\times 36=288$, *Ans.*

35. $(529\times 6)\div 1587=2$, *Ans.*

36. $(\overline{15125\div 3025}\times 48)\div 24=10$, *Ans.*

37. $4392\div 4+378=1476$, *Ans.*

38. $450+\frac{11}{13}+15=469$, *Ans.*

Art. 171.

10.

		10778
3281	3	9843
2805	3	935
476	1	476
459	1	459
Ans. 17	27	459

		14877
10353	1	10353
9048	2	4524
1305	3	3915
1218	2	609
Ans. 87	7	609

11.

		1116
620	1	620
496	1	496
124	4	496

		1488
Ans. 124	12	1488

		5184
396	13	5148
396	11	36

		6914
36	192	6912
36	18	2, Ans.

12. G. C. D. of 240 ft., 648 ft., and 420 ft.=12 ft., *Ans.*

13. G. C. D. of 231 bu., 393 bu., and 609 bu.=3 bu.

14. (15292 bu.+1520 bu.+504 bu.)÷4, G. C. D.,= 4329 bags, *Ans.*

15. G. C. D. of \$630, \$1134, and \$1386=\$126; \$630÷\$126=5; \$1134÷\$126=9; \$1386÷\$126 =11, *Ans.*

16. G. C. D. of 1729 ft. and 5850 ft. is 13.

$\overline{(7579 \times 2} \div 13) \times 7 = 8162$ rails, *Ans.*

Art. 178.

4. Divisors, $(2 \times 7 \times 37) \times$ quotients, $(9 \times 11) = 51282$.

5. Divisors, $(13 \times 2 \times 3 \times 2 \times 5) \times$ quotient, $2 = 1560$.

6. Divisors, $(2 \times 5 \times 3 \times 2 \times 2) \times$ quotients, $(4 \times 3 \times 5) = 7200$, *Ans.*

7. Divisors, $(3 \times 17) \times$ quotients, $(3 \times 20) = 3060$, *Ans.*

8. Divisors, $(2 \times 2) \times$ quotients, $(5 \times 3 \times 7 \times 4) = 1680$.

9. Prime Factors, $5 \times 7 \times 9 = 315$, *Ans.*

10. Divisors, $(2 \times 2 \times 3 \times 5 \times 2) \times$ quotient, $2 = 240$ oranges, *Ans.*

11. Divisors, $3 \times 2 \times 5) \times$ quotients, $(3 \times 2) = 180$, *Ans.*

12. Divisor, $2 \times$ quotients, $(5 \times 2 \times 3) = \$60$, *Ans.*

13. L. C. M., $96 \times$ G. C. D., $4 = 384$, *Ans.*

14. L. C. M., $630 \div$ G. C. D., $10 = 63$, *Ans.*

15. Divisors, $(2 \times 2 \times 3 \times 3 \times 3) \times$ quotients, $(2 \times 7 \times 3) = \$4536$, *Ans.*

16. Divisors, $(2 \times 2 \times 2 \times 2) \times$ quotients, $(5 \times 9) = 720$ *bushels, Ans.*

Art. 182.

5. $\frac{\overset{7}{35} \times \overset{2}{33} \times 26}{15 \times 14 \times 11} = 14$, *Ans.*

3. $\frac{\overset{10}{140} \times \overset{13}{39} \times 13 \times 7}{7 \times 26 \times 21} = 130$, *Ans.*

7. $\frac{\overset{3}{11} \times 21 \times 26}{14 \times 13} = 33$, *Ans.*

8. $\frac{\overset{61}{183} \times 78 \times 70 \times 12 \times 5}{14 \times 9 \times 3 \times 20 \times 5 \times 6} = 61$, *Ans.*

9. $\frac{\overset{71}{213} \times \overset{19}{190} \times \overset{11}{14} \times 264}{56 \times 36 \times 30} = 14839$, *Ans.*

10. $\frac{\overset{4}{240} \times \overset{2}{56} \times \overset{2}{18}}{60 \times 28 \times 9} = 16$, *Ans.*

11. $\frac{\overset{4}{72} \times \overset{4}{48} \times \overset{4}{28} \times 5}{84 \times 15 \times 7 \times 6} = 9\frac{4}{7}$, *Ans.*

12. $\frac{\overset{33}{66} \times 18 \times \overset{3}{27} \times 25}{84 \times 45 \times 7 \times \overset{14}{30}} = 1\frac{1}{28}$, *Ans.*

13. $\frac{\overset{2}{80} \times 60 \times 50 \times 16 \times 14}{70 \times 50 \times 24 \times 20} = 32$, *Ans.*

14. $\frac{64 \times 7 \times 31 \times 15 \times 88 \times 13}{9 \times 56 \times 55 \times 4 \times 6} = 403$, Ans.

15. $\frac{\overset{10}{\cancel{12}} \times \cancel{60} \times \cancel{21} \times \cancel{35}}{\cancel{7} \times \cancel{15} \times \underset{7}{\cancel{42}} \times \cancel{100}} = 1\frac{3}{4}$, *Ans.*

16. $\frac{\overset{4}{\cancel{77}} \times \cancel{100} \times 18 \times \overset{4}{\cancel{64}}}{\cancel{25} \times \cancel{11} \times \underset{7}{\cancel{49}} \times \cancel{16}} = 41\frac{1}{7}$, *Ans.*

17. $\frac{\overset{2}{\cancel{\$.4}} \times \overset{5}{\cancel{45}}}{\cancel{\$1}\cancel{0}} = 10$ tons, *Ans.*

18. $\frac{\overset{7}{\cancel{\$.70}} \times \overset{14}{\cancel{112}}}{\cancel{\$.}\cancel{00}} = 98$ bbl., *Ans*

19. $\frac{\overset{65}{\cancel{\$.10}} \times \cancel{195} \times 7}{\underset{3}{\cancel{\$.30}} \times \underset{8}{\cancel{56}}} = 8\frac{1}{8}$ tubs, *Ans.*

20. $\frac{\overset{4}{\cancel{\$.50}} \times \cancel{48}}{\cancel{12}} = \$2.00$, *Ans.*

21. $\frac{\overset{5}{\cancel{\$.10}} \times \cancel{55} \times \cancel{24}}{\cancel{00}\text{ bbl.} \times \cancel{3}} = \$.50$, *Ans.*

22. $\frac{\overset{9}{\cancel{\$.27}} \times \overset{4}{\cancel{20}}}{\cancel{15}\text{ lb.}} = \$.36$, *Ans.*

23. $\frac{\overset{120}{\cancel{\$.75}} \times \cancel{240}}{\cancel{\$.1.50}}$ 120 bushels, *Ans.*

24. $\frac{\overset{22}{\cancel{\$.40}} \times \cancel{132}}{(\$.75 \times 2) + \$.40} = 22$ yd. of 2d; $22 \times 2 = 44$ yd. of 1st, *Ans.*

25. $\frac{\overset{7}{\$.\cancel{35}} \times \cancel{2} \times \overset{11}{\cancel{22}} \times \cancel{¢}}{\cancel{24}\text{ lb.} \times \cancel{8}} = \$.77$, *Ans.*

26. $\frac{\overset{144}{\cancel{\$7.20}} \times \cancel{12}}{\cancel{\$.60}} = 144$ bushels, *Ans.*

27. $\frac{\overset{4}{\cancel{3}\text{s.}} \times \cancel{28} \times \cancel{21}}{\cancel{7}\text{s.} \times \cancel{63}} = 4$ chests, *Ans.*

28. $\frac{\overset{16}{\cancel{\$.80}} \times \overset{3}{\cancel{75}}}{\cancel{\$1.25}} = 48$ days' work, *Ans.*

Art. 226.

1. $124\frac{1}{4} - 36\frac{2}{13} = 88\frac{5}{52}$, *Ans.*

2. $216\frac{8}{9} - 147\frac{4}{7} = 69\frac{20}{63}$, *Ans.*

3. $700\frac{5}{8} - 517\frac{35}{56} = 182\frac{41}{56}$, *Ans.*

4. $1042\frac{13}{21} - (166\frac{5}{9} - 214\frac{3}{7}) = 1014\frac{44}{63}$, *Ans.*

5. $\frac{133}{144} - (\frac{1}{8} + \frac{5}{12} + \frac{5}{18}) = \frac{5}{48}$, *Ans.*

6. $\frac{17}{21} - \frac{4}{9} = \frac{89}{63}$, *Ans.*

7. $1446\frac{1}{16} - 1297\frac{1}{24} = 149\frac{1}{48}$, *Ans.*

8. $\$30 - (\$15\frac{3}{8} + \$9\frac{5}{12} + \$3\frac{7}{16}) = \$1\frac{37}{48}$ gain, *Ans.*

9. $\frac{46}{21} - \frac{61}{56} = 1\frac{17}{168}$, *Ans.*

10. $11\frac{1}{2} - 5\frac{4}{11} = 6\frac{3}{22}$, *Ans.*

11. $48 - 13\frac{1}{14} = 34\frac{13}{14}$, *Ans.*

12. $73\frac{1}{10} - 4\frac{11}{15} = 68\frac{11}{30}$, *Ans.*

13. $68\frac{7}{9} + 89\frac{19}{21} = 158\frac{13}{21}$, *Ans.*

14. $342 - 13\frac{2}{65} = 328\frac{43}{65}$, *Ans.*

15. $182\frac{1}{3} - 171\frac{1}{2} = 265\frac{3}{10}$, *Ans.*

16. $\$707\frac{55}{100} + \$91\frac{9}{10} = \$699\frac{9}{20}$, *Ans.*

Art. 232.

17. $\$4\frac{5}{8} \times 15 = \$69\frac{5}{8}$, *Ans.*

18. $\$7\frac{1}{8} \times \frac{22}{4} = \$21\frac{21}{32}$, *Ans.*

19. $\$\frac{69}{16} \times \$\emptyset = \$345$, *Ans.*

20. $\$\frac{9}{16} \times \frac{27}{6} = \$12\frac{3}{20}$, *Ans.*

21. $\$15\frac{3}{10} \times 4\frac{1}{8} = \$63\frac{9}{80}$, *Ans.*

22. $\$\frac{13}{5} \times \frac{5}{8} = \$145\frac{3}{5}$, *Ans.*

23. $\$\frac{15}{4} \times \frac{37}{2} = \$231\frac{1}{8}$, *Ans.*

24. $\$\frac{37}{2} \times 12\emptyset = \$11.65\frac{1}{2}$, *Ans.*

25. $\$\frac{25}{2} = \frac{367}{16} = \$229\frac{3}{4}$, *Ans.*

26. $\$\frac{1028}{5} \times \$\emptyset = \$7196$, *Ans.*

27. $\$\frac{61}{16} \times \frac{7}{8} \times \frac{47}{8} \times \frac{2}{8} = \$5734$, *Ans.*

28. $\$1\frac{3}{3} \times \frac{229}{4} = \$47\frac{17}{24}$, *Ans.*

29. $\$\frac{13}{16} \times \frac{1}{8} = \$\frac{13}{32}$, *Ans.*

30. $\$125 \times \frac{9}{16} = \$28\frac{1}{8}$, *Ans.*

31. $\$\frac{67}{5} \times \frac{149}{16} = \$199\frac{33}{80}$, *Ans.*

32. $\$365\frac{7}{8} \times \frac{1}{5} = \$73\frac{7}{40}$ loss, *Ans.*

33. $\$\frac{7}{8} \times \frac{507}{4} = \$110\frac{29}{32}$, *Ans.*

34. $\frac{\overset{59}{\cancel{177}}}{\cancel{3}} \times \frac{\overset{805}{\cancel{1449}}}{\underset{18}{\cancel{18}}} + \frac{2365}{18} = 424\frac{46}{81}$, *Ans.*

Art. 235.

9. $7)\overline{42\frac{7}{8}}$

$6\frac{1}{8}$, *Ans.*

10. $8)\overline{128\frac{11}{20}}$

$16\frac{11}{160}$, *Ans.*

11. $\frac{3067}{56 \times 21} = 4\frac{443}{1176}$, *Ans.*

12. $\frac{745}{5 \times 48} = 5\frac{25}{144}$, *Ans.*

13. $\frac{3577}{12 \times 25} = 12\frac{77}{300}$, *Ans.*

14. $3\,|\,\cancel{0})\overline{51\,|\,\cancel{0}\frac{5}{6}}$

$17\frac{1}{36}$, *Ans.*

15. $\$\frac{\overset{7}{\cancel{35}}}{\cancel{3} \times \cancel{28}} = \$\frac{1}{12}$, *Ans.*

16. $\frac{437}{6 \times 14} = 5\frac{17}{84}$, the other, *Ans.*

17. $\frac{\overset{7}{\cancel{35}}}{\cancel{36} \times \cancel{25}} = \frac{7}{180}$, *Ans.*

18. $\$\frac{4099}{4 \times 12} = \$101\frac{23}{48}$, *Ans.*

19. $\frac{\overset{217}{\cancel{651}}}{\cancel{5} \times \cancel{45}} = 14\frac{7}{15}$, *Ans.*

20. $\$\frac{\overset{3852}{\cancel{3852}}}{5 \times \cancel{54}} = \$85\frac{3}{5}$, *Ans.*

21. $\frac{2991}{8 \times 33} = 39\frac{9}{256}$, the other, *Ans.*

22. $\frac{\overset{219}{\cancel{24009}}}{32 \times 11} = 6\frac{27}{32}$ lb., *Ans.*

23. $\frac{\overset{11}{\cancel{2112}}}{2} \times \frac{1}{12} \times \frac{1}{1} = 176\frac{1}{12}$ lb., *Ans.*

Art. 238.

32. $\frac{4869}{16} \times \frac{5}{8} = 1521\frac{9}{16}$, *Ans.*

33. $\frac{21}{\cancel{189}} \times \frac{3}{\cancel{8}} = 63$, *Ans.*

34. $\frac{85}{\cancel{595}} \times \frac{3}{\cancel{7}\,\cancel{68}\,29} = 8\frac{23}{29}$, *Ans.*

35. $\$6270 \times \frac{5}{3} = \$10450$, *Ans.*

36. $\frac{7}{\cancel{8}\,\cancel{28}} \times \frac{7}{\cancel{21}\,4} = 12\frac{1}{4}$ tons, *Ans.*

37. $\$\frac{43}{\cancel{86}} \times \frac{\cancel{5}}{\cancel{37}} \times \frac{1}{\cancel{8}\,4} = \$\frac{43}{148}$, *Ans.*

38. $\$.\overset{\cdot 03}{\cancel{33}} \times \frac{3}{11} \times \frac{27}{4} = \$2.18\frac{1}{4}$, *Ans.*

40. $\frac{7}{\cancel{8}\,2} \times \frac{1}{\cancel{3}} = 1\frac{1}{6}$, *Ans.*

41. $\frac{21}{\cancel{35}\,5} = \frac{7}{\cancel{77}\,\cancel{55}} = 1\frac{22}{125}$, *Ans.*

42. $\frac{529}{\cancel{9} \times \cancel{18}\,9} = 64\frac{3}{81}$, *Ans.*

43. $\frac{3}{\cancel{4}\,2} \times \frac{7}{\cancel{8}} \times \frac{\cancel{15}\,5}{\cancel{9}} = 1\frac{17}{18}$, *Ans.*

44. $\frac{3}{\cancel{8}} \times \frac{\cancel{11}}{\cancel{12}} \times \frac{\cancel{12}}{\cancel{1}} \times \frac{2}{\cancel{11}} = 2$, *Ans.*

45. $\frac{3}{\cancel{25}\,5} \times \frac{\cancel{21}\,6}{\cancel{17}} = \frac{18}{85}$, *Ans.*

46. $\$\frac{\cancel{15}\,5}{\cancel{2}} \times \frac{5}{\cancel{22}\,2} = 6\frac{1}{4}$ mo., *Ans.*

47. $\frac{\cancel{48}\,2}{\cancel{25}\,10} \times \frac{\cancel{2}}{\cancel{35}} = 1\frac{13}{350}$, *Ans.*

48. $\frac{\cancel{17}\,3}{\cancel{55}\,2} \times \frac{\cancel{33}}{\cancel{31}} = 2\frac{49}{62}$, *Ans.*

49. $\frac{5}{\cancel{6}} \times \frac{\cancel{3}}{7} \times \frac{\cancel{15}}{\cancel{14}\,5} = \frac{25}{28}$, *Ans.*

50. $\frac{\cancel{121}}{\cancel{2}\,5} - \frac{\cancel{2} \times 17}{73} = 15\frac{37}{146}$, *Ans.*

51. $\frac{44}{\cancel{88}\times 3}{}_{9} \times \frac{1}{15} \times \frac{17}{\cancel{34}} = 5\frac{73}{135}$, *Ans.*

52. $\frac{\cancel{24}\,3}{\cancel{11}\,\cancel{6}} \times \frac{\cancel{3}}{\cancel{15}\,61} = \frac{747}{3542}$, *Ans.*
$\quad\cancel{22}$

Art. 245.

1. $72 \div 18 = 4$, $\frac{5}{18} \times \frac{4}{4} = \frac{20}{72}$; $72 \div 3 = 24$, $\frac{3}{3} \times \frac{24}{24} = \frac{48}{72}$;
$72 \div 8 = 9$, $\frac{1}{8} \times \frac{8}{8} = \frac{63}{72}$; $72 \div 9 = 8$, $\frac{7}{9} \times \frac{8}{8} = \frac{56}{72}$, *Ans.*

2. Divisors, $(2 \times 3) \times$ quotients, $(7 \times 2) = 84$, L. C. M.

3. $1206\frac{5}{8} + 470\frac{1}{8} = 1677\frac{17}{40}$, the greater, *Ans.*

4. $\frac{77}{10} - \frac{62}{15} = 3\frac{17}{30}$, *Ans.*

5. $\frac{\cancel{48}\,69}{\cancel{8}\,\cancel{81}\,\cancel{7}} \times \frac{5}{\cancel{8}} = 3043\frac{1}{8}$, *Ans.*

6. $1 - \frac{62}{63} = \frac{1}{63}$; $144 \times \frac{63}{1} = 9072$, *Ans.*

7. $\$\frac{11\,5\,3}{\cancel{2}\,\cancel{3}\,\cancel{2}} \times \frac{4}{\cancel{3}} = \$4612$, *Ans.*
$\quad\cancel{8}$

8. $1 - \frac{103}{120} = \frac{17}{120}$; $\$1500 \times \frac{120}{17} = \$10588\frac{4}{17}$, *Ans.*

9. $\frac{7}{\cancel{3}} \times \frac{\cancel{13}}{\cancel{4}} = 7\frac{7}{12}$, divisor, *Ans.*
$\quad 3$

10. $\$\frac{5473}{\cancel{4}} \times \frac{2}{\cancel{4}} = \$10946$, *Ans.*

11. $\$\frac{\cancel{4}}{\cancel{4}} \times \frac{7}{\cancel{4}} \times \frac{\cancel{8}}{\cancel{16}} = \$4$, *Ans.*

12. $\$\frac{\cancel{3}\times 5}{\cancel{4}} \times \frac{5}{\cancel{16}} = \$.75$, *Ans.*

13. $(\frac{543}{2} - \frac{3077}{16}) \times \frac{289}{8} = \$4577\frac{3}{8}$, *Ans.*

14. $\$\frac{6163}{\cancel{6}} \times \frac{1}{\cancel{6}} = \$4101\frac{3}{16}$, *Ans.*
$\quad 3$

15. $\$\frac{39}{\cancel{12}\,\cancel{6}} \times \frac{\cancel{12}}{\cancel{4}} = 47$ tons, *Ans.*
$\quad\cancel{8}$

16. 240 *mi.* $\times \frac{2}{\cancel{3}} \times \frac{7}{\cancel{2}} = 146\frac{2}{3}$ mi., Ans.
$\quad 3$

17. A does $\frac{1}{8}$ in 1 day; B and C, $\frac{1}{6}$; hence,
A, B, and C do $\frac{1}{8}+\frac{1}{6}=\frac{7}{24}$, in 1 day;
and, $1\div\frac{7}{24}=3\frac{3}{7}$ days, *Ans.*

18. A, B, and C do $\frac{1}{5}$ in 1 day; B and C, $\frac{1}{8}$; hence,
A does $\frac{1}{5}-\frac{1}{8}=\frac{3}{40}$, in 1 day;
and, $1\div\frac{3}{40}=13\frac{1}{3}$ days, *Ans.*

19. $\$6\frac{1}{8}\times\frac{5}{2\times4}\times\frac{2\times2}{4}=\$192\frac{3}{16}$, *Ans.*

20. $\$\overset{71}{2}\frac{1}{2}\times\frac{1}{4}\times\frac{3}{1}\times\frac{3}{7\frac{1}{2}}=\$4\frac{31}{150}$, *Ans.*

21. $\$\overset{11}{9}\overset{25}{0}\overset{}{0}\times\frac{3}{4}\times\frac{5}{1\frac{1}{2}}=\$5625$, *Ans.*

22. $\frac{11}{12}+\frac{3}{5}=\frac{19}{20}$; $\frac{19}{20}-\frac{11}{12}=\frac{1}{30}$, increased, *Ans.*

23. $\frac{10}{7}+\frac{3}{5}=\frac{18}{15}$; $\frac{10}{7}-\frac{18}{15}=\frac{8}{35}$, diminished, *Ans.*

24. $\$1\frac{2}{3}\times\frac{5}{8}\times\frac{5}{8}=9\frac{13}{48}$ bushels, *Ans.*

25. $\$12500\times\frac{12}{5}=\$30000$, estate;
$\$12500\times\frac{4}{7}=\$8928\frac{4}{7}$, daughter's share;
$\$\overset{25}{2}\frac{1}{2}\frac{1}{2}\frac{1}{2}\times\frac{1}{\overset{1}{2}\overset{1}{2}\overset{1}{2}\overset{1}{2}}=\frac{25}{84}$, *Ans.*

26. $\$\frac{2\,2\,2\,2}{2}\div3675=\$\frac{1}{2}$, *Ans.*

27. $\$\overset{189}{2}\frac{1}{2}\frac{1}{2}\times\frac{1}{2\,2}\times\frac{2}{\frac{1}{4}}=378$ bbl., *Ans.*

28. $\frac{47}{2\frac{1}{2}\frac{1}{2}}$ A. $\times\frac{1}{2}\times\frac{1}{2}\times\frac{2}{2}=47$ acres;

$\$85\times\left(\overline{\frac{94}{2\frac{1}{2}\frac{1}{2}}\text{ A.}\times\frac{4}{2}-47}\right)=\$3329\frac{1}{6}$, *Ans.*

29. $\$\overset{36}{3}6\overset{}{0}\times\frac{3}{1\frac{1}{2}}=\$108$, *Ans.*

30. $\$6\frac{3}{2}\times\frac{2}{1\frac{1}{2}}\times\frac{7}{1}=14\frac{7}{10}$ cords, *Ans.*

31. $\left(\overline{\$\overset{13}{2}\frac{1}{2}\times\frac{3}{4}\div\$4}\right)+7=20$ bbl., *Ans.*

32. $\$\frac{2\,2}{2}\times\frac{\overset{2}{4}}{2\times2}\times\frac{7}{8}=\$1\frac{3}{4}$, *Ans.*

33. ($3500 − $740) × $\frac{2}{3}$ = $1840, *Ans.*

34. $\frac{4}{5} - \frac{1}{2} = \frac{3}{10}$; $\frac{\overset{61}{\cancel{183}}}{\underset{2}{\cancel{2}}}$ ft. × $\frac{\overset{5}{\cancel{10}}}{\cancel{3}} = 152\frac{1}{2}$ feet, *Ans.*

35. $\frac{21}{5} - \frac{4}{5} = \frac{17}{5}$; $\frac{17}{5} \div 2 = 1\frac{7}{10}$, less; $1\frac{7}{10} + \frac{4}{5} = 2\frac{1}{2}$, greater.

36. $\frac{1}{3} + \frac{1}{4} + \frac{2}{13} = \frac{115}{156}$; $\frac{156}{156} - \frac{115}{156} = \frac{41}{156}$;

$\overset{62}{\$2542} \times \frac{156}{41} = \$9672$, total amount;

$\$9672 \div 3 = \$3224$, cotton; $\$9672 \div 4 = \$2418$, sugar;

$\overset{744}{\$9672} \times \frac{2}{13} = \$1488$, molasses, *Ans.*

37. $\frac{\overset{3}{\cancel{15}}}{23} \times \frac{7 \times 1}{3} \times \frac{\overset{7}{\cancel{14}}}{\underset{2}{\cancel{8}}} \times \frac{9}{2} = \frac{1323}{200}$;

$\frac{1323}{200} + \frac{25}{6} = \frac{6469}{600}$; $\frac{6469}{\underset{200}{\cancel{600}}} \times \frac{3}{7} = \frac{6469}{1400}$;

$\frac{6469}{600} - \frac{6469}{1400} = 6\frac{169}{1050}$, *Ans.*

38. $\frac{\overset{5}{\cancel{15}}}{\underset{7}{\cancel{63}}} \times \frac{\overset{5}{\cancel{15}}}{14} = \frac{25}{98}$, *Ans.*

39. $\frac{65}{\underset{3}{\cancel{12}}} = \frac{\overset{7}{\cancel{14}} \times 3}{27} = 5\frac{59}{81}$, *Ans.*

40. $\frac{7}{3} - \frac{22}{25} = 1\frac{19}{75}$, *Ans.*

41. $\frac{2}{3} + \frac{57}{220} = \frac{611}{660}$, *Ans.*

42. $\frac{7}{4} \times \frac{5}{3} = 2\frac{1}{3}$, *Ans.*

43. $\frac{107}{5} + 2 - \frac{4}{5} = 22\frac{1}{5}$, *Ans.*

44. $\frac{306}{407} - \frac{1}{4} = \frac{817}{1628}$, *Ans.*

45. $2 \div 4 = \frac{1}{2}$, *Ans.*

Art. 290.

4. $43.1875 − $16.5 = $26.6875, *Ans.*

5. 1.1066 − .630482 = .376118, *Ans.*

6. $304.96 − $143.875 = $161.085, Ans.

7. 2—.00345=1.99655, *Ans.*

8. 10.0402—.000026=10.040174, *Ans.*

9. 115—11.5=103.5, *Ans.*

10. 5—.0000125=4.9999875, *Ans.*

11. $.875—$.625=$.25, *Ans.*

12. $.75—$.6875=$.0625, *Ans.*

13. 7.005—.7005=6.3045, *Ans.*

14. 1.169375—.9308571=.2385179, *Ans.*

15. 1.875—.001875=1.873125, *Ans.*

16. $200—$70.9375=$129.0625, *Ans.*

17. .4—.0433=.3567, *Ans.*

18. .96875—.392=.57675, *Ans.*

19. .105—.015=.09, *Ans.*

20. 7346 A.—5151.15 A.=2194.85 acres, *Ans.*

21. $70—$63.541=$6.46, *Ans.*

22. $311.5+$100.08=$411.58, *Ans.*

23. .95+.7125=1.6625, *Ans.*

24. 5.45—1.375=4.075, *Ans.*

25. $250—$155.95+$.95=$95, *Ans.*

26. $49.12—$2.05=$47.07, *Ans.*

Art. 293.

14. 3.126×.046×.3=.0431388, *Ans.*

15. 9.375×.075×10=7.03125, *Ans.*

16. *18.75×1.001*×.8=15.015, *Ans.*

17. .1875 × .045 = .0084375, *Ans.*

18. 327.5 × .9 × 4.25 = 1252.6875, *Ans.*

19. $8.56 × .0625 × 100 = $53.5, *Ans.*

20. 18.36 × .00625 × 1000 = 114.75, *Ans.*

21. .0075 × 100 × .082 = .0615, *Ans.*

22. $19.50 + $87.4725 + $48.875 = $155.8475, *Ans.*

23. 127.25 bu. × 4.375 = 556.71875 bu., *Ans.*

24. $2.625 × 170 = $446.25, *Ans.*

25. $4.38 × 100 = $438, *Ans.*

26. $72.75 × 204.7 = $14891.925, *Ans.*

27. $.0925 × 580.5 = $53.69625, *Ans.*

28. $97.625 × 126 = $12300.75, *Ans.*

29. $.85 × 36.75 × 3.625 = $113.2359375, *Ans.*

30. $198.55 − $97.375 = $101.175, *Ans.*

31. $450.75 − $79.38 + $18.12 = $389.49, *Ans.*

32. $74.75 × 3.25 = $242.9375, *Ans.*

33. .913976 + 401.875 = 402.788976, *Ans.*

34. 4.93 × .9 = 4.437, *Ans.*

35. 4.31564 − 2.625 = 1.69064, *Ans.*

36. (.0408375 + .02948) × 100 = 7.03175, *Ans.*

Art. 296.

27. $1730.75 ÷ ($4816 ÷ 64) = 23 tons, *Ans.*

28. 32.4 yd. ÷ 2.7 yd. = 12 coats, *Ans.*

29. $4885.80 ÷ $287.4 = 17 horses, Ans.

30. $224.40 \times (\overline{\$82.5 \div 125} \times 2.5) = 136$ bbl., *Ans.*

31. $(\$11.375 \times 3.5) \times 20.125 = \$65.40625$, *Ans.*

32. $\$46.75 \div (\$6.375 \div .75) = 5.5$ cwt, *Ans.*

33. $(\$4.5 \times 10.75) \div 7.74 = \$6.25$, *Ans.*

34. $(\$125 - \overline{\$3.25 \times 12.5}) \div \$.625 = 135$ lb., *Ans.*

35. $(.056 + .01575 \times 100) - .8 = .831$, *Ans.*

36. $713.286 \div (.306 \times 1.5) = 1554$, *Ans.*

37. $(.0006 \times 10000 + 80) \div .125 = 688$, *Ans.*

38. $6.562 + 1.134 \div 3.702 = 2.07887$, *Ans.*

39. $\$469.464 \times .03715 \times 100 = \$1744.0598+$, *Ans.*

40. $\$4396.40 \div \$10.47 - \$125 = \$295$, *Ans.*

Art. 313.

2. $750 \div 3 = \$250$, *Ans.* $750 \div 4 = \$187.50$, *Ans.*

3. $631 \div 2 = \$315.50$. $\$1250 \div 2 = \$625$. $\$1605 \div 2 = \$802.50$, *Ans.*

4. $\overline{43 \times 12} \div 3 = \$172$, *Ans.*

5. $(\overline{140 \div 6} + \overline{204 \div 12}) - (41 \div 2) = \$19.83+$, *Ans.*

7. $642 + (642 \div 3) = \$856$, *Ans.*

8. $320 + (320 \div 5) = \$384$, *Ans.*

Art. 314.

2. $\$318 \times 3 = 954$. $\$318 \times 2 = 636$, *Ans.*

3. $\$240 \times 6 = 1440$. $\$240 \times 5 = 1200$. $\$240 \times 4 = 960$.

4. $\$350 \times 16 = 5600$. $\$350 \times 12 = 4200$, *Ans.*
$\$350 \times 10 = 3500$. $\$350 \times 8 = 2800$, *Ans.*

5. $\$150.75 \times 4 = 603$, *Ans.*

Art. 315.

2. ($9.375 × 1684) ÷ 100 = $157.875, *Ans.*

3. ($174.55 × 2284) ÷ 1000 = $3986.772, *Ans.*

4. ($.98 × 4575) ÷ 100 = $44.835, *Ans.*

5. ($8.75 × 53672) ÷ 1000 = $4696.30, *Ans.*

6. ($3.125 × 2108) ÷ 100 = $65.875, *Ans.*

7. ($16.25 × 2700) ÷ 100 = $438.75, *Ans.*

8. $\overline{\$10.50 \times 875} \div 1000 = \$9.1875$, *Ans.*

9. $\overline{\$1.86 \times 2160} \div 100 = \$40.176$, *Ans.*

10. $\overline{\$5.75 \times 3080} \div 1000 = \$17.71$, *Ans.*

11. ($11.375 × 28642) ÷ 1000 = $325.80275, *Ans.*

12. ($12.375 × 1480) ÷ 100 = $183.15, *Ans.*

13. $\overline{\$5.75 \times 3700} \div 100 = \$212.75$, *Ans.*

14. ($6.875 × 12500) ÷ 1000 = $85.9375, *Ans.*

15. ($15.50 × 527) ÷ 1000 + ($1.625 × 972) ÷ 100) = $23.96+, *Ans.*

Art. 316.

2. ($4.75 ÷ 2) × 2.806 = $6.66425, *Ans.*

3. ($2.80 ÷ 2) × 21.672 = $30.3408, *Ans.*

4. ($51.75 ÷ 2) × 150 × .1625 = $630.703+, *Ans.*

5. $(\overline{\$7.50 \div 2} \times 6.34) + (\overline{\$6.25 \div 2} \times 5.08) = \$39.65$, *Ans.*

6. ($26.44 ÷ 2) × 1.526 = $20.17372, *Ans.*

Art. 328.

1. ($38 ÷ 4.75) × 7.5 = $60, *Ans.*

2. ($5.635 ÷ .875) × 9.25 = $59.57, Ans.

3. ($54.72 ÷ 36.48) × 14.25 = $21.375, *Ans.*

4. $6.975 ÷ .93 = $7.50, *Ans.*

5. ($15.875 ÷ .125) × 25.42 = $3228.34, *Ans.*

6. ($2.856 ÷ 1680) × 2000 = $3.40, *Ans.*

7. $.625 × .8 = $.5040, *Ans.*

8. $6.25 × 186.4 = $1165, *Ans.*

9. ($121.50 ÷ 2) × 1.375 = $83.53, *Ans.*

10. $9.75 × 19.6 = $191.10, *Ans.*

11. $7.50 × .625 = $4.6875, *Ans.*

12. ($101.5 ÷ 29) × 35 = $122.5, *Ans.*

13. $9.60 ÷ 28.8 = $.33⅓, *Ans.*

14. $194.40 ÷ $\overline{36 \times 36}$ = $.15, *Ans.*

15. ($1.625 × 108.6 = $176.475, *Ans.*

16. ($25.5 × 1.22) + ($2.125 × 18.66) + ($3.50 × 9.525) = $104.10, *Ans.*

17. $70.15 ÷ ($1.37 + $.95 + $.73) = 23 bu., *Ans.*

18. $4.625 + ($453.75 ÷ 27.5) = $21.125, *Ans.*

19. 645 T. − ($\overline{645 \text{ T.} \times .375}$ + $\overline{645 \text{ T.} \times \frac{5}{12}}$) = 134.375 T.

20. $\frac{16282}{20} \times \frac{847}{32}$ = 21557.47343, *Ans.*

21. $55.92 ÷ ($.875 + $.1875 + $.1025) = 48 lb., *Ans.*

22. ($2.25 × 2400) − ($15.90 × 240) = $1584, *Ans.*

23. $8000 × .375 × .15 = $450, *Ans.*

24. ($6.375 × 150) + ($1.44 × 350) = $1460.25 cost;

($8.25 × 105 + $2.06 × 350) − $1460.25 = $127, partial gain;

(*$363.25 − $127*) ÷ (150 − 105) = $5.25 per bbl., *Ans.*

25. ($339.625 − $78.375) ÷ 209 = $1.25, *Ans.*

26. $\frac{3}{4} \times \frac{1}{2} \times \frac{1}{2} = \frac{3}{20} = .15$, *Ans.*

27. $\overline{(\$.75 \times 28.5} + \overline{\$1.50 \times 4.53}) \div (12.52 \div 2) = \$4.50$,

28. $\$4.3125 \times \frac{4}{5} \times 27 = \$2251.125$, cost,

$(\$2251.125 + \$381.875 + \$9.625) \div (\frac{4}{5} \times 27) = \$5.06\frac{1}{4}$.

29. (\$34.125 ÷ 10.5) × 60.375 = $196.21875, *Ans.*

30. $93.50 ÷ ($12.75 ÷ 150) = 1100 lb., *Ans.*

31. $\frac{3}{10} + \frac{3}{5} = \frac{9}{10}$; $1 - \frac{9}{10} = \frac{1}{10}$, oats;

$108 ÷ ($.625 × .3 + $1.875 × .6 + $.375 × .1) = 80 bu.

32. 7.12 ÷ 4.23 = 1.6832 +, *Ans.*

33. $17.60 × (5.225 ÷ 2) = $45.98, value of the hay;

$5.25 × 2.81 = $14.7525 " " pork;

$.18 × 31 = $5.58 " " sheeting;

$4.50 × 11.5 = $51.75, " " cloth.

($45.98 + $14.7525) − ($5.58 + $51.75) = $3.40, *Ans.*

34. $\overline{(\$140.30 \div \$.95} + \$1.37 + \$.73) \times 3 = 138$ bu., *Ans.*

35. $\overline{(\$100 \times 150} - \$3900) \div 150 = \$74$, cost per acre.

$\overline{(\$100 \times 150} - \overline{\$3900 + \$2250}) \div 150 = \$59$, sold per acre, *Ans.*

36. ($1.40 × 2500) + ($.54 × 735) = $3896.90, cost of both;

($1.40 × 1470) + $435.875 = $2593.875, sale of flour;

($.54 × 528) − $30 = $255.12, sale of oats;

$1.25 × (2500 − 1470) = $1287.50, sold remainder of wheat;

$.45 × (735 − 528) = $93.15, sold remainder of oats;

($2593.875 + $255.12 + $1287.50 + $93.15) − $3896.90 = $232.745, gain, *Ans.*

Art. 425.

2. $\overline{7 \text{ lb.} \times 12} + 10 \text{ oz.} = 94 \text{ oz.}$;
$\overline{94 \text{ oz.} \times 20} + 16 \text{ pwt.} = 1896 \text{ pwt.}$;
$\overline{1896 \text{ pwt.} \times 24} + 11 \text{ gr.} = 45515 \text{ gr.}$, *Ans.*

3. $\overline{3 \text{ T.} \times 20} + 6 \text{ cwt.} = 66 \text{ cwt.}$;
$\overline{66 \text{ cwt.} \times 100} + 21 \text{ lb.} = 6621 \text{ lb.}$;
$\overline{6621 \text{ lb.} \times 16} + 12 \text{ oz.} = 105948 \text{ oz.}$, *Ans.*

4. $\overline{12 \text{ fath.} \times 6} + 3 \text{ ft.} = 75 \text{ ft.}$;
$\overline{75 \text{ ft.} \times 12} + 10 \text{ in.} = 910 \text{ in.}$, *Ans.*

5. $\overline{6 \text{ wk.} \times 7} + 5 \text{ da.} = 47 \text{ da.}$;
$\overline{47 \text{ da.} \times 24} + 9 \text{ hr.} = 1137 \text{ hr.}$;
$\overline{1137 \text{ hr.} \times 60} + 25 \text{ min.} = 68245 \text{ min.}$, *Ans.*

6. $\overline{12 \text{ mi.} \times 320} + 36 \text{ rd.} = 3876 \text{ rd.}$;
$\overline{3876 \text{ rd.} \times 16\frac{1}{2}} + 10 \text{ ft.} = 63964 \text{ ft.}$, *Ans.*

7. $\overline{10 \text{ rd.} \times 16\frac{1}{2}} + 5\frac{1}{2} \text{ ft.} = 170\frac{1}{2} \text{ ft.}$;
$170\frac{1}{2} \text{ ft.} \times 12 = 2046 \text{ in.}$, *Ans.*

8. $27\frac{3}{4} \text{ yd.} \times 8 = 222$ eighths, *Ans.*

9. $\overline{1 \text{ A.} \times 160 \times 30\frac{1}{4}} + 15 \text{ sq. yd.} = 4855 \text{ sq. yd.}$;
$4855 \text{ sq. yd.} \times 9 = 43695 \text{ sq. ft.}$, *Ans.*

10. $\overline{2 \text{ sq. mi.} \times 640} + 125 \text{ A.} = 1405 \text{ A.}$;
$1405 \text{ A.} \times 160 = 224800 \text{ P.}$, *Ans.*

11. $14 \text{ sq. mi.} \times 640 = 8960 \text{ A.}$, *Ans.*

12. $\overline{3 \text{ mi.} \times 80} + 51 \text{ ch.} = 291 \text{ ch.}$;
$\overline{291 \text{ ch.} \times 100} + 6 \text{ l.} = 29106 \text{ l.}$, *Ans.*

13. $\overline{75 \text{ Cd.} \times 8} + 6 \text{ cd. ft.} = 606 \text{ cd. ft.}$;
$606 \text{ cd. ft.} \times 16 = 9696 \text{ cu. ft.}$, *Ans.*

14. 12 hhd. × 63 + 21 gal. = 777 gal.;
777 gal. × 8 = 6216 pt., *Ans.*

15. 24 bu. × 4 + 3 pk. = 99 pk.; 99 pk. × 8 = 792 qt., *Ans.*

16. Cong. 4 × 8 + O. 5 = O. 37;
O. 37 × 16 + f ʒ 8 = f ʒ 600;
f ʒ 600 × 8 = f ʒ 4800, *Ans.*

17. 31½ gal. × 32 = 1008 gi., *Ans.*

18. 7 T. × 20 + 9 cwt. = 149 cwt.;
149 cwt. × 100 + 18 lb. = 14918 lb., *Ans.*

19. 22 lb. × 12 + 10 oz. = 274 oz.;
274 oz. × 20 = 5480 pwt., *Ans.*

20. ℔ 16 × 12 + ʒ 7 = ʒ 199; ʒ 199 × 8 + ℥ 3 = ℥ 1595;
℥ 1595 × 3 = ℈ 4785, *Ans.*

21. 365 da. × 24 × 60 = 525600 min., *Ans.*

22. June, 30 da. + July, 31 da. + Aug., 31 da. = 92 da.;
92 da. × 24 × 60 × 60 = 7948800 sec., *Ans.*

23. 266 da. × 24 = 8784 hr., *Ans.*

24. 10 S. × 30 + 22° = 322°; 322° × 60 + 5′ = 19325′.

25. 5 bun. × 2 × 20 = 200 quires, *Ans.*

26. 6 Gr. gross × 12 × 12 = 864 doz., *Ans.*

27. 336½ sov. × 240 = 78360d., *Ans.*

28. 26½ fr. × 100 = 2650 centimes, *Ans.*

29. £34½ × 240 = 8280d., *Ans.*

30. 5 lb. 9 oz. 14 pwt. = 1394 pwt.;
$.75 × 1394 = $1045.50, *Ans.*

31. $\frac{3}{4}$ mi. $\times 4 = 3$ mi.; 3 mi. $\times 320 = 960$ rd., *Ans.*

32. 2 bu. $\times 4 + 3$ pk. $= 11$ pk.;
1548 bu. $\times 4 + 1$ pk. $= 6193$ pk.;
6193 pk. $\div 11$ pk. $= 563$ bbl., *Ans.*

33. 9 cwt. $\times 1000 + 60$ lb. $= 960$ lb.;
960 lb. $\div 12 = 80$ boxes, *Ans.*

34. \$4.75 $\times 9 =$ \$42.75; 9 bu. $\times 64 = 576$ pt.;
\$.125 $\times 576 =$ \$72; \$72 $-$ \$42.75 $=$ \$29.25, *Ans.*

35. 42 mi. $\times 5280 + 221760$ ft.;
221760 ft. $\div 16.5$ ft. $= 13440$ times, *Ans.*

36. Summer, or spring months $= 132480$ min.;
Autumn $= 131040$ min.;
132480 min. $- 131040$ min. $= 1440$ min., *Ans.*

37. 4 rm. $\times 20 + 10$ qr. $= 90$ qr.;
90 qr. $\times 24 = 2160$ sheets, *Ans.*

38. $2 \times 12 \times 12 \times 12 \times$ \$.12$\frac{1}{2} =$ \$432, *Ans.*

39. 28 da. $\times 24 \times 60 \times 60 = 2419200$ times, *Ans.*

40. 21 yr. $\times 365 + 26$ da. $+ 5$ da. $= 7696$ da.;
7696 da. $\times 24 \times 60 = 11082240$ min., *Ans.*

41. 120 lea. $\times 3 \times 1.152\frac{8}{9} = 414.96$ statute mi., *Ans.*

42. 31$\frac{1}{2}$ gal. $\times 8 = 252$ pt.; 1 qt. $= 2$ pt.; 2 qt. $= 4$ pt.;
252 pt. $\div$ (1 pt. $+ 2$ pt. $+ 4$ pt.) $= 36$ of each, *Ans.*

43. 100 yr. $\times 365 + 24$ da. $= 36524$ da.;
36524 da. $\times 24 = 876576$ hr., *Ans.*

44. 2 bales $\times 5 + 2$ bun. $= 12$ bun.;
12 bun. $\times 40 + 15$ qr. $= 495$ qr.;
495 qr. $\times 24 = 11880$ sh.;
11880 sh. $\div 8$ *sh.* $= 1485$ copies, *Ans.*

45. 16 sh. $\times$ 8 $\times$ 2 = 256 pages, *Ans.*

46. 36.25 cent. $\times$ 100 = 3625 pounds, *Ans.*

47. 42$\frac{4}{7}$ bbl. $\times$ 196 = 8344 pounds, *Ans.*

48. 29.5 quint. $\times$ 100 = 2950 pounds, *Ans.*

49. 116.5 bbl. $\times$ 280 = 3262 pounds, *Ans.*

50. 63.25 kegs $\times$ 100 = 6325 pounds, *Ans.*

51. 75 bu. $\times$ .75 $\times$ 56 = 3150 pounds, *Ans.*

52. 125.75 bu. $\times$ 60 = 7545 pounds, *Ans.*

53. 14432 bu. $\times$ 32 = 461824 pounds, *Ans.*

54. 40 bu. $\times$ .7 $\times$ 50 = 1400 pounds, *Ans.*

55. 7.5 casks $\times$ 240 = 1800 pounds, *Ans.*

56. 28 sov. $\times$ 4.8665 = \$136.262, *Ans.*

57. £25.5 $\times$ 4.8665 = \$124.09575, *Ans.*

58. \$.193 $\times$ 25 = \$4.825, *Ans.*

59. \$.238 $\times$ 42.5 = \$10.015, *Ans.*

Art. 428.

5. 3168000 in. $\div$ 63360 in. = 50 mi., *Ans.*

6. 256800 P. $\div$ 160 P. = 1605 A., *Ans.*

7. 27878400 sq. ft. $\div$ 27878400 sq. ft. = 1 sq. mi., *Ans.*

8. 216840 cu. in. $\div$ 1728 cu. in. = 125$\frac{3}{16}$ cu. ft., *Ans.*

9. 38042 cu. ft. $\div$ 16 cu. ft. = 2377 cd. ft. 10 cu. ft.;
2377 cd. ft. $\div$ 8 cd. ft. = 297 Cd. 1 cd. ft.;
297 Cd. 1 cd. ft. 10 cu. ft., *Ans.*

10. 30876 gi.÷4 gi.=7719 pt.;
7719 pt.÷2 pt.=3859 qt. 1 pt.;
3859 qt.÷4 qt.=964 gal. 3 qt.;
964 gal.÷63 gal.=15 hhd. 19 gal.;
15 hhd. 19 gal. 3 qt. 1 pt., *Ans.*

11. 27072 qt.÷32 qt.=846 bu., *Ans.*

12. 66742 pt.÷2 pt.=33371 qt.;
33371 qt.÷4 qt.=8342 gal. 3 qt.;
8342 gal.÷31½ gal.=264 bbl. 26 gal.;
264 bbl. 26 gal. 3 qt., *Ans.*

13. 103720 pt.÷8 pt.=12965 gal., *Ans.*

14. f ʒ 8106÷f ʒ 16=O. 506 f ʒ 10;
O. 506÷O. 8=Cong. 63 O. 2;
Cong. 63 O. 2 f ʒ 10, *Ans.*

15. 85894 gr.÷24 gr.=3578 pwt. 22 gr.;
3578 pwt.÷20 pwt.=178 oz. 18 pwt.;
178 oz.÷12 oz.=14 lb. 10 oz.;
14 lb. 10 oz. 18 pwt. 22 gr., *Ans.*

16. 51570 lb.÷100 lb.=515 cwt. 70 lb.;
515 cwt.÷20 cwt.=25 T. 15 cwt.;
25 T. 15 cwt. 70 lb., *Ans.*

17. 40607 oz.÷16 oz.=2537 lb. 15 oz.;
2537 lb.÷100 lb.=25 cwt. 37 lb.;
25 cwt. 37 lb. 15 oz., *Ans.*

18. 3000 pwt.÷20 pwt.=150 oz.;
150 oz.÷12 oz.=12 lb. 6 oz., *Ans.*

19. 12060 lb.÷60 lb.=201 bu., *Ans.*

20. 3038 lb ÷196 lb.=15 bbl. 98 lb., *Ans.*

21. 6496 lb.÷32 lb.=203 bu., *Ans.*

22. 3172 lb.÷100 lb.=31 quin. 72 lb., *Ans.*

23. 3114061 sec.÷60 sec.=51901 min. 1 sec.;
51901 min.÷60 min.=865 hr. 1 min.;
865 hr.÷24 hr.=36 da. 1 hr.;
36 da.÷7 da.=5 wk. 1 da.;
5 wk. 1 da. 1 hr. 1 min. 1 sec., *Ans.*

24. 8263420 min.÷60 min.=137723 hr. 40 min.;
137723 hr.÷24 hr.=5738 da. 11 hr.;
5738 da.÷30 da.=191 mo. 8 da.;
191 mo. 8 da. 11 hr. 40 min., *Ans.*

25. 2007200″÷60″=33453′ 20″;
33453′÷60′=557° 33′; 557° 33′ 20″, *Ans.*

26. 5270 N. mi.÷60 N. mi.=87 deg. 50 N. mi., *Ans.*

27. 120400 pens÷144 pens=836 gro. 16 pens, *Ans.*

28. 2734 eggs÷12 eggs=227 doz. 10 eggs, *Ans.*

29. 5020 balls÷20 balls=251 scores, *Ans.*

30. 10738 sh.÷24 sh.=447 qr. 10 sh.;
447 qr.÷20 qr.=22 rm. 7 qr.;
22 rm. 7 qr. 10 sh., *Ans.*

31. 6048 qr.÷20 qr.=302 rm. 8 qr.;
302 rm.÷2 rm.=151 bun.; 151 bun. 8 qr., *Ans.*

32. 24684d.÷12d.=2057s.; 2057s.÷5s.=411 cr. 2s.

33. 4076s.÷2s.=2038 florins, *Ans.*

34. $194.66÷$2.43325=80 half-sovereigns, *Ans.*

35. 42346 far.÷4 far.=10586d. 2 far.;
10586d.÷12d.=882s. 2d.; 882s.÷20s.=£44 2s.;
£44 2s. 2d. 2 far., *Ans.*

36. \$86.85 ÷ \$.193 = 450 francs, *Ans.*

37. \$225.40 ÷ \$4.8665 = 46.316 sov. = 46 sov. 6s. 3d. 3 far. +, *Ans.*

38. \$47.70 ÷ \$.2385 = 200 marks, *Ans.*

39. \$.10 × 5280 × 3200 = \$1689600, *Ans.*

40. 175 lb. × 27 = 4725 lb., *Ans.*

41. \$.56 × (1860 ÷ 32) = \$32.549, *Ans.*

42. 423 mi. ÷ 60 = 7° 3′, *Ans.*

43. (25 min. + 20 min.) + $\overline{(40 \times 365 + 9)}$ = 657405 min.; 657405 min. = 456 da. 12 hr. 45 min., *Ans.*

44. \$.125 × 15 = \$1.875, *Ans.*

45. \$1.20 × (2000 ÷ 50) = \$48, *Ans.*

46. (\$.62 × $\overline{2496 \div 52}$) + (\$.44 × $\overline{1920 \div 32}$) = \$56.16.

Art. 431.

2. $\frac{1}{\frac{1}{4}}$ rd. × $\frac{11}{2}$ × $\frac{3}{1}$ = $\frac{1}{8}$ ft., *Ans.*

3. $\frac{1}{\frac{1}{2}}$ oz. × $\frac{20}{1}$ × $\frac{24}{1}$ = $\frac{1}{2}$ gr., *Ans.*

4. $\frac{1}{\frac{1}{4}}$ hhd. × $\frac{3}{\frac{1}{1}}$ × $\frac{1}{4}$ × $\frac{2}{1}$ = $\frac{3}{4}$ pt., *Ans.*

5. £.012 × 20 = 24s., *Ans.*

6. $\frac{3}{\frac{1}{2}}$ lb. × $\frac{16}{1}$ = $\frac{3}{8}$ oz., *Ans.*

7. $\frac{7}{\frac{1}{9}}$ A. × $\frac{160}{1}$ = $\frac{7}{9}$ sq. rd., *Ans.*

8. .005 bu. × 4 × 8 × 2 = .32 pt., *Ans.*

9. $\frac{12}{\frac{7}{4}}$ rd. × $\frac{11}{4}$ = $1\frac{4}{7}$ yd., *Ans.*

10. .0000625 *mi.* × 5280 = .33 ft., *Ans.*

11. $\frac{2}{27}$ lb. $\times \frac{4}{1} = \frac{8}{9}$ oz., *Ans.*

12. $\frac{1}{1760}$ mi. $\times \frac{5}{1} \times \frac{11}{2} = \frac{5}{6}$ yd., *Ans.*

13. $\frac{1}{45}$ rd. $\times \frac{5}{1} = \frac{5}{9}$ l., *Ans.*

14. .000175 da. $\times 24 \times 60 = .252$ min., *Ans.*

15. $\frac{27}{160} \frac{8}{323}$ A. $\times \frac{160}{1} = \frac{64}{323}$ sq. rd., *Ans.*

Art. 433.

2. £$\frac{13}{20}$ $\times \frac{20}{1} = 10\frac{5}{6}$s.; $\frac{5}{6}$s. $\times \frac{12}{1} = 10$d.; 10s. 10d., *Ans.*

3. .35 ℔ $\times 12 = \frac{7}{2}$ 4.2; $\frac{7}{2}$ .2 $\times 8 =$ ʒ 1.6; ʒ .6 $\times 3 =$ ℈ 1.8; ℈.8 $\times 20 =$ gr. 16; $\frac{7}{2}$ 4 ʒ 1 ℈ 1 gr. 16, *Ans.*

4. $\frac{4}{15}$ mi. $\times \frac{64}{1} = 85\frac{1}{3}$ rd.; $\frac{1}{3}$ rd. $\times \frac{33}{2} = 5\frac{1}{2}$ ft.;

$\frac{1}{2}$ ft. $\times \frac{6}{1} = 6$ in.; 85 rd. 5 ft. 6 in., *Ans.*

5. .75 lb. $\times 12 = 9$ oz., *Ans.*

6. .625 fath. $\times 6 = 3.75$ ft.; .75 ft. $\times 12 = 9$ in.;
3 ft. 9 in., *Ans.*

7. .55 lb. $\times 16 = 8.8$ oz., *Ans.*

8. $\frac{4}{7}$ mo. $\times \frac{30}{1} = 17\frac{1}{7}$ da.; $\frac{1}{7}$ da. $\times \frac{24}{1} = 3\frac{3}{7}$ hr.;
$\frac{3}{7}$ hr. $\times \frac{60}{1} = 25\frac{5}{7}$ min.; $\frac{5}{7}$ min. $\times \frac{60}{1} = 42\frac{6}{7}$ sec.;
17 da. 3 hr. 25 min. 42$\frac{6}{7}$ sec., *Ans.*

9. £.555 $\times 20 = 11.1$s.; 1s. $\times 12 = 1.2$d.; 11s. 1.2d., *Ans*

10. $\frac{7}{13}$ A. $\times \frac{160}{1} = 86\frac{2}{13}$ P.; $\frac{2}{13}$ P. $\times \frac{121}{4} = 4\frac{17}{26}$ sq. yd.;

$\frac{17}{26}$ sq. yd. $\times \frac{9}{1} = 5\frac{23}{26}$ sq. ft.;
$\frac{23}{26}$ sq. ft. $\times \frac{144}{1} = 127\frac{5}{13}$ sq. in.;
86 P. 4 sq. yd. 5 sq. ft. 127$\frac{5}{13}$ sq. in., Ans.

11. $\frac{5}{12}$ lb. $\times \frac{16}{1} = 6\frac{2}{3}$ oz., *Ans.*

12. $\frac{6}{15}$ cu. yd. $\times \frac{27}{1} = 14\frac{2}{5}$ cu. ft.;
$\frac{2}{5}$ cu. ft. $\times \frac{1728}{1} = 691\frac{1}{5}$ cu. in.;
14 cu. ft. $691\frac{1}{5}$ cu. in., *Ans.*

13. .1934 S. $\times 30 = 5.802°$; $.802° \times 60 = 48.12'$;
$.12' \times 60 = 7.2''$; $5° \; 48' \; 7.2''$, *Ans.*

14. f ʒ .7 $\times 8$ = f ʒ 5.6; f ʒ .6 $\times 60$ = ℥ 36; f ʒ 5 ℥ 36.

15. $\frac{607}{32}$ T. $\times \frac{20}{1} \times 18\frac{1}{32}$ cwt.; $\frac{1}{32}$ cwt. $\times \frac{100}{1} = 96\frac{7}{8}$ lb.;
$\frac{7}{8}$ lb. $\times \frac{16}{1} = 14$ oz.; 18 cwt. 96 lb. 14 oz., *Ans.*

16. .875 hhd. $\times 63 = 55.125$ gal.; $.125$ gal. $\times 4 = .5$ qt.;
.5 qt. $\times 2 = 1$ pt.; 55 gal. 1 pt., *Ans.*

17. $\frac{5}{9}$ sq. rd. $\times \frac{121}{4} = 16\frac{29}{36}$ sq. yd.;
$\frac{29}{36}$ sq. yd. $\times \frac{9}{1} = 7\frac{1}{4}$ sq. ft.; $\frac{1}{4}$ sq. ft. $\times \frac{144}{1} = 36$ sq. in.;
16 sq. yd. 7 sq. ft. 36 sq. in., *Ans.*

18. ℔ $\frac{15}{22} - \frac{6}{1} =$ ℥ $8\frac{2}{11}$; ℥ $\frac{2}{11} \times \frac{8}{1} =$ ʒ $1\frac{5}{11}$;
ʒ $\frac{5}{11} \times \frac{3}{1} =$ ℈ $1\frac{4}{11}$; ℈ $\frac{4}{11} \times \frac{20}{1} =$ gr. $7\frac{3}{11}$;
℥ 8 ʒ 1 ℈ 1 gr. $7\frac{3}{11}$, *Ans.*

19. $\frac{4}{7}$ Gr. gro. $\times \frac{12}{1} = 6\frac{6}{7}$ gro.; $\frac{6}{7}$ gro. $\times \frac{12}{1} = 10\frac{2}{7}$ doz.;
$\frac{2}{7}$ doz. $\times \frac{12}{1} = 3\frac{3}{7}$ units; 6 gro. 10 doz. $3\frac{3}{7}$ units, *Ans.*

20. .67 lea. $\times 3 = 2.01$ geo. mi.;
2.01 geo. mi. $\times 1.152\frac{8}{9} = 2.31686$ com. mi.;
.31686 com. mi. $\times 320 = 101.3952$ rd.;
.3952 rd. $\times 16\frac{1}{2} = 6.5208$ ft.;
.5208 ft. $\times 12 = 6.2496$ in.;
2 mi. 101 rd. 6 ft. 6.2496 in., *Ans.*

21. .125 bbl. × 31½ = 3.9375 gal.; .9375 gal. × 4 = 3.75 qt.; .75 qt. × 2 = 1.5 pt.; .5 pt. × 4 = 2 gi.; 3 gal. 3 qt. 1 pt. 2 gi., *Ans.*

22. .578125 bu. × 4 = 2.3125 pk.; .3125 pk. × 8 = 2.5 qt.; .5 qt. × 2 = 1 pt.; 2 pk. 2 qt. 1 pt., *Ans.*

23. .6625 mi. × 320 = 212 rd., *Ans.*

24. $\frac{11}{2}$ T. × $\frac{7}{9}$ = $4\frac{5}{18}$ T.; $\frac{5}{9}$ T. × $\frac{20}{1}$ = $5\frac{5}{9}$ cwt.; $\frac{5}{9}$ cwt. × $\frac{100}{1}$ = $55\frac{5}{9}$ lb.; $\frac{5}{9}$ lb. × $\frac{16}{1}$ = $8\frac{8}{9}$ oz.; 4 T. 5 cwt. 55 lb. $8\frac{8}{9}$ oz., *Ans.*

25. $\frac{11}{8}$ A. × $\frac{8}{5}$ = $1\frac{3}{5}$ A.; $\frac{3}{5}$ A. × $\frac{160}{1}$ = 60 P.; 1 A. 60 P., *Ans.*

26. $\frac{21}{2}$ Cd. × $\frac{1}{5}$ = 2.7 Cd.; .7 Cd. × 128 = 89.6 cu. ft.; 2 Cd. 89.6 cu. ft., *Ans.*

27. .225 mi. × $\frac{4}{5}$ = .18 mi.; .18 mi. × 320 = 57.6 rd.; .6 rd. × $16\frac{1}{2}$ = 9.9 ft.; .9 ft. × 12 = 10.8 in.; 57 rd. 9 ft. 10.8 in., *Ans.*

28. .3125 rm. × 20 = 6.25 qr.; 25 qr. × 24 = 6 sh.; 6 qr. 6 sh., *Ans.*

29. $\frac{13}{16}$ T. × $\frac{50}{1}$ = 650 lb.; \$.08⅓ × 650 = \$54.16⅔, *Ans.*

Art. 435.

2. $\frac{3}{11}$ gi. × $\frac{1}{4}$ × $\frac{1}{2}$ × $\frac{1}{4}$ = $\frac{1}{44}$ gal., *Ans.*

3. $\frac{3}{5}$s. × $\frac{1}{10}$ = £$\frac{1}{50}$, *Ans.*

4. .64 pt. ÷ 64 pt. = .01 bu., *Ans.*

5. .576 gr. ÷ 5760 gr. = .0001 lb., *Ans.*

6. .8 lb. × 2000 lb. = .0004 T., *Ans.*
.36 cwt. ÷ 20 cwt. = .018 T., *Ans.*

7. $\frac{3}{4\frac{1}{2}}$ cd. ft. × $\frac{1}{\frac{8}{2}}$ = $\frac{3}{9\frac{8}{2}}$ Cd., *Ans.*

8. .216 gr. ÷ 480 gr. = .00045 oz., *Ans.*

9. $\frac{5}{7}$ lb. × $\frac{1}{\frac{28}{400}}$ = $\frac{1}{2800}$ T., *Ans.*

10. $\frac{3}{4}$ min. × $\frac{1}{\frac{60}{20}}$ × $\frac{1}{\frac{24}{8}}$ = $\frac{1}{640}$ da., *Ans.*
.12 hr. ÷ 24 hr. = .005 da., *Ans.*

11. 3.96 in. ÷ 198 in. = .02 rd., *Ans.*

12. $\frac{1}{\frac{63}{35}}$ hhd. × $\frac{63}{1}$ × $\frac{4}{1}$ × $\frac{8}{1}$ = $\frac{63}{35}$ pt.;
$\frac{63}{35}$ pt. − $\frac{3}{5}$ pt. = $\frac{12}{35}$ pt., *Ans.*

13. $\frac{7}{8}$ sq. rd. × $\frac{1}{160}$ = $\frac{7}{1440}$ A., *Ans.*

Art. 437.

2. 3 gal. 3 qt. 1½ pt. = 63 half pt.; 1 bbl. = 504 half pt.;
$\frac{63}{504}$ bbl. = $\frac{1}{8}$ bbl., *Ans.*

3. 8 cu. ft. ÷ 16 cu. ft. = .5 cd. ft.;
3.5 cd. ft. ÷ 8 cd. ft. = .4375 Cd., *Ans.*

4. 3.62 gi. ÷ 4 gi. = .905 pt.; .905 pt. ÷ 2 pt. = .4525 qt.;
3.4525 qt. ÷ 4 qt. = .863125 gal.;
13.863125 gal. ÷ 63 gal. = .22 hhd. +, *Ans.*

5. 10 oz. 13 pwt. 9 gr. = 5121 gr.; 1 lb. = 5760 gr.;
$\frac{5121}{5760}$ lb. = $\frac{569}{640}$ lb., *Ans.*

6. 2 T. 7 cwt. 28 lb. = 4728 lb.;
5 cwt. 91 lb. = 591 lb.; $\frac{591}{4728}$ = $\frac{1}{8}$, *Ans.*

7. 3 A. 80 P. = 560 P.; 51.52 P. ÷ 560 P. = .092.

8. f ℥ 5 ℔ 36 = ℔ 336 ; f ℥ 1 = ℔ 480 ; f ℥ $\frac{336}{480}$ = f ℥ .7.

9. 12 P. ÷ 16 P. = .75 sq. ch. ; 4.75 sq. ch. ÷ 10 = .475 A. ;
126.475 A. ÷ 640 A. = .1976171875 sq. mi. ;
.1976171875 sq. mi. ÷ 36 sq. mi. = .0054893663 Tp.

10. 25° 42′ 40″ = 92560″ ; 7° 42′ 48″ = 27768″ ;
27768″ ÷ 92560″ = .3, *Ans.*

11. 28 gal. 2 qt. = 114 qt. ; 1 hhd. = 252 qt. ;
252 qt. − 114 qt. = 138 qt. ; $\frac{138}{252}$ hhd. = $\frac{23}{42}$ hhd., *Ans.*

12. 3.6 in. ÷ 36 in. = .1 yd. ; 1.1 yd. ÷ 5½ yd. = .2 rd. ;
3.2 rd. ÷ 320 rd. = .01 com. mi. ;
2.01 com. mi. ÷ 1.152$\frac{8}{9}$ com. mi. = 1.7438 geo. mi. ;
1.7438 geo. mi. ÷ 3 geo. mi. = .58+ lea., *Ans.*

13. 110 lb. 4 oz. = 1764 oz. ; 3 bbl. = 9408 oz. ;
$\frac{1764}{9408}$ bbl. = $\frac{3}{16}$ bbl., *Ans.*

14. $\frac{13}{4}$ lb. × $\frac{1}{4}$ = 3.25 lb. ; 3.25 lb. ÷ 100 lb. = .0325 cwt. ;
.0325 cwt. ÷ 20 cwt. = .001625 T., *Ans.*

15. .45 pk. ÷ 4 pk. = .1125 bu. ;
.1125 bu. ÷ 1.25 bu. = .09 bu., *Ans.*

16. 54 Cd. = 6912 cu. ft. ; $\frac{4800}{6912}$ Cd. = $\frac{25}{36}$ Cd., *Ans.*

17. 18s. 5d. 2$\frac{2}{13}$ far. = $\frac{1180}{13}$ far. ;
£1 = $\frac{1248}{13}$ far. ; £$\frac{1180}{1248}$ = £$\frac{118}{132}$, *Ans.*

Art. 438.

1. (21 mi. × 63360) ÷ 30 in. = 44352 steps, *Ans.*

2. 60° = 216000″ ; 3′ 12″ = 192″ ;
216000″ ÷ 192″ = 18 hr. 45 min., *Ans.*

3. £10.925 × 4.8665 = $53.1665125, Ans.

4. ($.125 × 5000) − $425.75 = $199.25, *Ans.*

5. 580 fr. × .193 = $111.94, *Ans.*

6. $291.99 ÷ $4.8665 = £60, *Ans.*

7. $4.20 × 30.53125 = $128.23⅛, *Ans.*

8. $.0625 × (1522 + 636) − ($4.25 × 15.22 + $5.60 × 6.36) = $34.574, *Ans.*

9. 36824 lb. ÷ 52 lb. = 708$\frac{2}{13}$ bu., Ill.;
36824 lb. ÷ 56 lb. ÷ 657$\frac{1}{7}$ bu., La.;
36824 lb. ÷ 58 lb. = 634$\frac{52}{58}$ bu., N. Y., *Ans.*

10. (5000 bu. × 32) ÷ 28 lb. = 5714$\frac{2}{7}$ bu., Ct.;
(5000 bu. × 32) ÷ 30 lb. = 5333⅓ bu., N. J., *Ans.*

11. 16 T. 3 cwt. 3 qr. 24 lb. = 36284 lb.;
3d. × 36284 = 108852d.; 108852d. = £453.55;
£453.55 × 4.8665 = $2207.201075;
36284 lb. = 18.142 *short* T.;
$140 × 18.142 = $2539.88;
$2539.88 − $2207.201075 = $332.679, gain, *Ans.*

12. $\frac{5}{6} \times \frac{\overset{3}{\cancel{24}}}{\underset{1}{\cancel{4}}} = 15$ carats, *Ans.*

13. (105.85 ch. × 40.15) ÷ 10 = 424.98775 A., *Ans.*

14. (90000 lb. ÷ 10 lb.) ÷ 100 = $90, *Ans.*

15. $75.75 × (189.5 rd. × 150 ÷ 160 sq. rd.) = $13457.46, *Ans.*

16. 2 bu. 3 pk. 6 qt. = 11.75 pk.; $.30 × 11.75 = $3.525.

17. $22.75 × 3.86 = $87.815, *Ans.*

18. 2 cwt. 10 lb. = 210 lb.; 3 bbl. × 210 = 630 lb.;
630 half-oz. = 19.6875 lb.; 19.687 half-oz. = .615 lb.
(19.687 + .615) × .12½ = $2.54.

19. *37 A. 128 P.* = *6048* P.; 170 A. 16 P. = 27216 P.;
27216 P. − *6048* P. = 21168 P.; $\frac{6048}{21168} = \frac{2}{7}$, Ans.

20. $3\frac{1}{2}$ T.$=7000$ lb.; $\$.095 \times 7000 = \$665$;
$\$665 - \$526.05 = \$138.95$, *Ans.*

21. $(2500 \text{ bu.} \times 35) \div 28 \text{ lb.} = 3125$ bu., *Ans.*

22. $(1500 \text{ bu.} \times 48) \div 100 \text{ lb.} = 720$ centals, *Ans.*

23. $(\overline{\$3.5 \times 12.9375} \div \$.04) \div 196 \text{ lb.} = 5\frac{3}{4}\frac{8}{9}$ bbl., *Ans.*

24. 3 T. 12 cwt. 20 lb.$=7220$ lb.; 5 T. 80 lb.$=10080$ lb.;
$\frac{7220}{10080} = \frac{361}{504}$; $\$15.75 \times \frac{504}{361} = \$21.988+$, *Ans.*

25. 37 Cd. 48 cu. ft.$=4784$ cu. ft.;
13 Cd. 59 cu. ft.$=1723$ cu. ft.; $\frac{17}{47}\frac{23}{84}$, *Ans.*

26. 58.625 gal.$\times 2 = 117.25$ gal.;
117.25 gi.$=3.664$ gal.; 3.664 gi.$=.1145$ gal.
$(3.664 + .1145) \times .80 = \$3.02$, *Ans.*

27. $(4500 \text{ sub.} \times 52) \div (24 \text{ sh.} \times 20) = 487\frac{1}{2}$ reams, *Ans.*

28. $336 \div 24 \times 10000 \div \overline{24 \times 20} = 291\frac{2}{3}$, no. of reams required without waste;
$291\frac{2}{3}$ is $\frac{19}{20}$ of the whole amount needed,
$291\frac{2}{3} \div \frac{19}{20} = 291\frac{2}{3} \times \frac{20}{19} = 307\frac{1}{57}$ reams, *Ans.*

Art. 441.

3.

42 Cd.	5 cd. ft.	0 cu. ft.	
16	6	12	
25	6	4,	*Ans.*

4. $\frac{15}{8}$ mi. $\times \frac{3}{7} = 1$ mi. 22 rd. 14 ft. $1\frac{5}{7}$ in.

$17\frac{1}{7}$ rd.	=	17	2	$4\frac{2}{7}$	
	1	39	16	6	
$120\frac{1}{3}$ rd.	=	120	5	6	
		239	11	0,	Ans.

5. $8\frac{9}{10}$ cwt.=8 cwt. 90 lb. 0 oz.
$48\frac{3}{8}$ lb. = 48 6
8 41 10, *Ans.*

6. £$\frac{4}{5}$ =11s. $1\frac{1}{3}$d.
$\frac{3}{8}$s.×$\frac{8}{9}$= 6
10 $7\frac{1}{3}$, *Ans.*

7. 5 lb. 4 oz. 8 pwt.
$\frac{3}{40}$ lb.= 18
5 3 10, *Ans.*

8. 2 wk. $3\frac{4}{7}$ da.=2 wk. 3 da. 20 hr. 0 min. 0 sec.
.659 wk. = 4 14 42 43.2
1 6 5 17 16.8, *Ans.*

9. $\frac{117}{124}$ hhd.=32 gal. 3 qt. 1 pt. 1 gi.
3 2 1 0
29 1 0 1, *Ans.*

10. $\frac{2}{3}$ lea.=2 geo. mi.;
2 geo. mi. × $1.152\frac{2}{3}$=$2.305\frac{1}{3}$ com. mi.;
$2.305\frac{1}{3}$—.7=$1.605\frac{1}{3}$=1 mi. 193.7 rd., *Ans.*

11. $\frac{5}{8}$ gro.=$7\frac{1}{2}$ doz.; $7\frac{1}{2}$ doz.—$\frac{2}{3}$ doz.=$6\frac{5}{6}$ doz., *Ans.*

12. ℥ 4 ℨ 0 ℈ 0
2 1
3 5 2, *Ans.*

13. $\frac{1}{4}$ wk.=1 da 18 hr. 0 min.
.9 da.= 21 36
20 24, *Ans.*

14. $\frac{15}{16}$ A.=150 P.; 150 P.—84.56 P.=65.44 P., *Ans.*

15.

14 gal.	1 qt.	1 pt.		63 gal.	0 qt.	0 pt.
10	3	0		54	0	2
29	0	1		8	3	0, *Ans.*
54	0	2;				

16.

75 A.	136.4 P.		250 A.	0 P.
56	123.3		132	99.7
132	99.7;		117	60.3=117.376875 A.;

$62.25 × 117.376875 = $7306.71+, *Ans.*

17.

	1 T.	11 cwt.	30 lb.
$\frac{1}{8}$ long T.=	17	92	
	13	38, *Ans.*	

18.

26 Cd.	7 cd. ft.	0 cu. ft.		125 Cd.	6 cd. ft.	0 cu. ft.
30	4	10		95	0	2
37	4	8		30	5	14, *Ans.*
95	0	2;				

Art. 442.

2.

1783 yr.	1 mo.	20 da.	
1775	4	19	
7	9	1, *Ans.*	

3.

1865 yr.	4 mo.	9 da.	
1861	4	11	
3	11	28, *Ans.*	

4.

1875 yr.	7 mo.	10 da.	
1873	1	16	
2	5	24, *Ans.*	

5. May, 31 da.—28 da. = 3 da.;
From June 1 to Feb. 10 = 255
258, *Ans.*

6.

1876 yr.	7 mo.	15 da.	15 hr.
1874	9	3	9
1	10	12	6, *Ans.*

8. June, 30 da.—20 da. = 10 da.;
From July 1 to Jan. 10 = 194
204, *Ans.*

9. January, 31 da.—10 da. = 21 da.;
From Feb. 1, 1876, to June 16 = 137
158, *Ans.*

10.

1875 yr.	12 mo.	12 da.	19 hr.	38 min.
1873	7	4	10	16
2	5	8	9	22, *Ans.*

11.

1878 yr.	1 mo.	1 da.	16 hr.	55 min.	24 sec.
1875	4	21	12	40	25
2	8	10	4	14	59, *Ans.*

Art. 443.

2.

2 bu.	3 pk.	6 qt.
		9
26	1	6, *Ans.*

3.

3 Cd.	36 cu. ft.
	12
39	*48* = 3 cd. ft., *Ans.*

4. (8 gal. 3 qt. 1 pt. 3.25 gi.) × 12 = 107 gal. 2 qt. 1 pt. 3 gi.;

(107 gal. 2 qt. 1 pt. 3 gi.) × 8=13 hhd. 42 gal. 3 qt

5. (42 bu. 1 pk. 5 qt. 1 pt.) × 8=339 bu. 1 pk. 4 qt.;

(339 bu. 1 pk. 4 qt.) × 8=2715 bushels, *Ans.*

6. (O. 8 f℥ 9 f℥ 6 ℔ 34) × 6=O. 51 f℥ 10 f℥ 7 ℔ 24;

(O. 51 f℥ 10 f℥ 7 ℔ 24) × 4=Cong. 25 O. 6 f℥ 11 f℥ 5 ℔ 36, *Ans.*

7. (£1 8s. 9½d.) × 12=£17 5s. 6d.;

(£17 5s 6d.) × 7=£120 18s. 6d., *Ans.*

8. $4800 ÷ $80=60;

(3 A. 24 P.. 20 sq. yd. 4 sq. ft.) × 60=189 A. 40 P. 16 sq. yd. 6 sq. ft., *Ans.*

10. (1 T. 6 cwt. 2 qr. 26 lb. 10 oz.) × 8=10 T. 13 cwt. 3 qr. 17 lb.;

(10 T. 13 cwt. 3 qr. 17 lb.) × 8=85 T. 11 cwt. 24 lb.;

(1 T. 6 cwt. 2 qr. 26 lb. 10 oz.) × 3=4 T. 23 lb. 14 oz.;

(85 T. 11 cwt. 24 lb.) + (4 T. 23 lb. 14 oz.)=89 T. 11 cwt. 1 qr. 19 lb. 14 oz., *Ans.*

11. (4 yd. 1 ft. 4.7 in.) × 5=22 yd. 11.5 in.;

(22 yd. 11.5 in.) × 5=110 yd. 4 ft. 9.5 in.;

(110 yd. 4 ft. 9.5 in.) × 5=557 yd. 2 ft. 11.5 in., *Ans.*

12. 7 T. 15 cwt. 10.5 lb.

1.7

12.9 5.5 17.85=13 T. 3 cwt. 67.85 lb., *Ans.*

13. 28 gal. 2 qt. 1 pt.

5

143 0 1=143⅛ gal.;

$1.375 × 143⅛=$196.796+, Ans.

14. 41 bu. 3 pk.
4
167 0; \$.75 × 167 = \$125.25, *Ans.*

Art. 444.

2. 7) 358 A. 57 P. 6 sq. yd. 2 sq. ft.
51 31 0 8, *Ans.*

3. 5) £35 9s. 7d.
7 1 11, *Ans.*

7) £35 9s. 7d.
5 1 $4\frac{3}{7}$, *Ans.*

8) £35 9s. 7d.
4 8 $8\frac{3}{8}$, *Ans.*

4. 9) 282 bu. 3 pk. 1 qt. 1 pt.
31 1 5 1, *Ans.*

10) 282 bu. 3 pk. 1 qt. 1 pt.
28 1 0 1.9, *Ans.*

12) 282 bu. 3 pk. 1 qt. 1 pt.
23 2 2 $\frac{1}{4}$, *Ans.*

5. 7) 254 yd. 4 ft. $3\frac{1}{3}$ in.
3) 36 1 $5\frac{13}{21}$
12 0 $5\frac{55}{63}$, *Ans.*

7) 254 yd. 4 ft. $3\frac{1}{3}$ in.
6) 36 1 $5\frac{13}{21}$
6 0 $2\frac{55}{63}$, *Ans.*

6. 12) 196 Cd. 4 cd. ft. 12 cu. ft.
6) 16 3 1
2 5 $13\frac{1}{12}$, *Ans.*

7. 26 mi.=137280 ft.;
137280 ft.÷16 ft.÷16 ft.=8580 rails, *Ans.*

8.

22.5)	24 sq. mi.	0 A.	140 P.	0 sq. yd.	0 sq. ft.
	1	42	112	26	8, *Ans.*

9.

	202 yd.	1 ft.	$6\frac{3}{4}$ in.
			5
3)	1012	1	$9\frac{3}{4}$
	337	1	$7\frac{1}{4}$, *Ans.*

10. 336 bu. 3 pk. 4 qt.=10780 qt.;
4 bu. 3 pk. 2 qt.=154 qt.;
10780 qt.÷154 qt.=70 times, *Ans.*

11. 356 bu. 3 pk. 5 qt.=11421 qt.;
1 bu. 1 pk. 7 qt.=47 qt.;
11421 qt.÷47 qt.=243 boxes, *Ans.*

13. 19 T.=380 cwt.; (380 cwt.+6 cwt.)÷41=$9\frac{17}{41}$ cwt.;
$\frac{17}{41}$ cwt.=$\frac{1700}{41}$ lb.; (1700 lb.+22 lb.)÷41=42 lb.;
9 cwt. 42 lb., *Ans.*

14. 4 mi.×4=16 sq. mi.; 16 sq. mi.=10240 A.;
10240 A.÷62 A.=165$\frac{10}{62}$ A.; $\frac{10}{62}$ A.=$\frac{1600}{62}$ P.;
1600 P.÷62=25$\frac{50}{62}$ P.; $\frac{50}{62}$ P.=$\frac{15125}{62}$ sq. yd.;
$\frac{15125}{62}$ sq. yd.÷62=24.39516+ sq. yd.;
165 A. 25 P. 24.395 sq. yd., *Ans.*

Art. 448.

2.

7 hr.	9 min.	$19\frac{1}{4}$ sec.	
		15	
107°	19′	$48\frac{3}{4}$″,	*Ans.*

3. 12 hr. 0 min. 0 sec.
9 1 37
2 58 23, dif. time.
15
44° 35′ 45″, dif. long.
77 51
122 26 45 W., *Ans.*

4. 1 hr. 5 min. 42 sec.
15
Take 16° 25′ 30″, dif. long.
From 87 37 45
71 12′ 15 W., Ans.

5. 6 hr. × 15 = 90° W., sunrise; 90° E., sunset;
12 hr. × 15 = 180° E., midnight, *Ans.*

Art. 450.

2. Ann Arbor, 83° 43′ 0″
Cambridge, 71 7 40
15) 12 35 20, dif. long.
50 min. 21⅓ sec., *Ans.*

3. West Point, 73° 57′ W.
Bombay, 72 54, E.
146 51, diff. long.
4
9 hr. 47 min. 24 sec., dif. time.
P. M. 3 30
A. M. 1 17 24 (next day), *Ans.*

4. Washington, 77° 0′ 15″ W.
Rome, 12 27 E.
15)89 27 15, dif. long.
5 hr. 57 min. 49 sec., *Ans.*

5. Chicago, 87° 37′ 45″ W.
Paris, 2 20 E.
15)89 57 45, dif. long.
5 hr. 59 min. 51 sec., *Ans.*

6. N. Orleans, 90° 2′ 30″ W.
N. York, 74 3 W.
15)15 59 30, dif. long.
1 hr. 3 min. 58 sec., *Ans.*

7. Jefferson City, 92° 8′ 0″ W.
Albany, 73 44 50 W.
15)18 23 10, dif. long.
1 hr. 13 min. 32⅔ sec., *Ans.*

8. St. Louis, 90° 15′ 15″ W.
Richmond, 77 25 45 W.
15)12 49 30, dif. long.
51 min. 18 sec., *Ans.*

9. Mexico, 99° 5′ W.
N. York, 74 3 W.
25 2, dif. long.
4
1 hr. 40 min. 8 sec., *Ans.*

10. Ann Arbor, 83° 43′ 0″ W.
Berlin, 13 23 45 E.
15)97 6 45, dif. long.
6 hr. 28 min. 27 sec, Ans.

11. San Fran. 122° 26′ 45″ W.
Mexico, 99 5 W.
15)23 21 45, dif. long.
1 hr. 33 min. 27 sec., *Ans.*

12. Cincinnati, 84° 29′ 31″ W.
Boston, 71 3 30 W.
15)13 26 1, dif. long.
Take 53 min. $44\frac{1}{15}$ sec., dif. time;
From 6 hr.
A. M. 5 hr. 6 min. $15\frac{14}{15}$ sec., *Ans.*

Chicago, 87° 37′ 45″ W.
Boston, 71 3 30 W.
15)16 34 15, dif. long.
Take 1 hr. 6 min. 17 sec., dif. time;
From 6
A. M. 4 hr. 53 min. 43 sec., *Ans.*

St. Louis, 90° 15′ 15″ W.
Boston, 71 3 30 W.
15)19 11 45, dif. long.
Take 1 hr. 16 min. 47 sec., dif. time;
From 6
A. M. 4 hr. 43 min. 13 sec., *Ans.*

13. Univ. Va., 78° 31′ 30″ W.
Berlin, 13 23 45 E.
15)91 55 15, dif. long.
6 hr. 7 min. 41 sec., dif. time;
P. M. 6
A. M. 12 hr. 7 min. 41 sec. (next day), *Ans.*

St. Paul, 95° 4′ 55″ W.
Univ. Va., 78 31 30 W.
15)16 33 25, dif. long.
Take 1 hr. 6 min. 13⅔ sec., dif. time;
From 6
P.M. 4 hr. 53 min. 46⅓ sec., *Ans.*

Astoria, 124° 0′ 0″ W.
Univ. Va., 78 31 30 W.
15)45 28 30, dif. long.
Take 3 hr. 1 min. 54 sec., dif. time.
From 6
P.M. 2 hr. 58 min. 6 sec., *Ans.*

14. N. York, 74° 3′ W.
Rome, 12 27 E.
86 30, dif. long.
4
5 hr. 46 min. 0 sec., later, *Ans.*

N. York, 74° 3′ W.
Paris, 2 20 E.
76 23, dif. long.
4
5 hr. 5 min. 32 sec., later, *Ans.*

15. San. Fran., 122° 26′ 45″ W.
Bombay, 72 54 E.
Take 195 20 45
From 360
15)164 39 15
Gains 10 hr. 58 min. 37 sec., Ans.

Art. 465.

1. 27 ft. $\times$ 21 = 567 sq. ft.; 567 sq. ft. $\div$ 9 = 63 sq. yd.

2. 195 sq. ft. $\div$ 26 = $7\frac{1}{2}$ ft. wide, *Ans.*

3. (305 sq. yd. $\times$ 9) $\div$ 45 = 61 ft. long, *Ans.*

4. $12\frac{1}{3}$ yd. $\times$ $12\frac{1}{3}$ = 152 sq. yd. 1 sq. ft., *Ans.*

5. $18\frac{2}{3}$ yd. $\times$ $18\frac{2}{3}$ = 348 sq. yd. 4 sq. ft., *Ans.*

6. 18.5 rd. $\times$ 20.5 = 379.25 sq. rd., *Ans.*

7. 5.14 ch. $\times$ 6.25 = 32 sq. ch. 2 P., *Ans.*

8. 25.5 ft. $\times$ 16.75 = 427.125 sq. ft., *Ans.*

9. 14 yd. 1 ft. 10 in. = 526 in.;
526 in. $\times$ 526 = 276676 sq. in.;
276676 sq. in. = 7 sq. rd. 1 sq. yd. 6 sq. ft. 88 sq. in.

10. 374.125 sq. ft. $\div$ 20.5 = 18.25 ft., width, *Ans.*

11. 52.5625 sq. ch. $\div$ 7.25 = 7.25 ch., length, *Ans.*

12. $180\frac{4}{9}$ sq. yd. $\div$ $9\frac{2}{3}$ = 18 yd. 2 ft., length, *Ans.*

13. $\overline{(16 \text{ ft.} \times 2 + 12.5 \text{ ft.} \times 2)} \times 9.25 = 58\frac{7}{12}$ sq. yd., *Ans.*

14. (24 ft. $\times$ 20) $\div$ (12 ft. $\times$ $\frac{5}{6}$) = 48 planks, *Ans.*

15. (24 ft. $\times$ 16.5) $\div$ 9 = 44 yd., *Ans.*

16. (52 ft. $\times$ 35) $\div$ (3 ft. $\times$ $2\frac{1}{3}$) = 260 yd., *Ans.*

17. (28 ft. $\times$ 23.75) $\div$ (3 ft. $\times$ 2.5) = $88\frac{2}{3}$ yd., *Ans.*

18. (27.25 ft. $\times$ 22.5) $\div$ (3 ft. $\times$ 2.5) = $81\frac{3}{4}$ yd., *Ans.*

19. \$.94 $\times$ $(\overline{34 \text{ ft.} \times 18.5} \div \overline{3 \text{ ft.} \times 2})$ = \$98.54$\frac{1}{3}$, *Ans.*

20. \$1.08 $\times$ $(\overline{30.25 \text{ ft.} \times 22} \div 9) \times \frac{4}{3}$ = \$106.48, *Ans.*

21. $2.125 × (18.5 ft. × 16.4 ÷ 9) × $\frac{8}{1}$ = $81.87, *Ans.*

22. $1.22 × (40 ft. × 36 ÷ 3 ft. × 4) = $146.40, *Ans.*

23. $1.15 × (26.5 ft. × 18) ÷ 9 = $60.95, *Ans.*

24. (48 ft. × 10 × 144) ÷ (8 in. × 8) = 1080 tiles, *Ans.*

25. $2.70 × (312 ft. × 6.5) ÷ 9 = $608.40, *Ans.*

26. $.45 × (48.5 ft. × 27) ÷ 9 = $65.475, *Ans.*

27. (104$\frac{3}{4}$ ft. × 20$\frac{1}{3}$) ÷ 100 = 21.29$\frac{11}{12}$ squares, *Ans.*

28. (40 ft. + 36.5 ft.) × 2 × 22.25 = 3404.25 sq. ft., sides;
40 ft. × 36.5 ft. = 1460 sq. ft., ceiling;
$.36 × (3404.25 + 1460 − 1375) ÷ 9 = $139.57, *Ans.*

29. $.75 × (8$\frac{1}{4}$ ft. × 5$\frac{1}{3}$) × 6 = $198, *Ans.*

30. (24 ft. + 16.5 ft.) × 2 × 18 = 1458 sq. ft., sides;
(2$\frac{1}{3}$ ft. × 5$\frac{2}{3}$ + 2$\frac{3}{4}$ ft. × 6$\frac{1}{3}$) × 2 = 62$\frac{7}{36}$ sq. ft., windows and doors;
(24 ft. + 16.5 ft. × 2) − (2.75 ft. × 2) = 75.5 ft., length of base;
75$\frac{1}{2}$ ft. × $\frac{3}{4}$ = 56$\frac{5}{8}$ sq. ft., area of baseboard;
1458 sq. ft. − (62$\frac{7}{36}$ sq. ft. + 56$\frac{5}{8}$ sq. ft.) = 1339$\frac{17}{72}$ sq. ft.;
1339$\frac{17}{72}$ sq. ft. ÷ (8 yd. × 3 × 3$\frac{1}{3}$) = 16.739756 rolls;
$1.20 × 16.739756 = $20.0877, cost of paper;
$.09 × (24 ft. + 16.5 ft.) × 2 = $7.29, cost of moulding;
$20.0877 + $7.29 = 27.378 +, *Ans.*

31. (53$\frac{1}{3}$ ft. × 28) ÷ (1$\frac{1}{3}$ ft. × 1$\frac{1}{3}$) = 840 sods, *Ans.*

32. 24 yd. × $\frac{3}{4}$ × $\frac{2}{3}$ = 28$\frac{4}{9}$ yd., *Ans.*

33. (16 ft. + 14 ft.) × 2 × 10 = 600 sq. ft., sides;
(600 sq. ft. − 124 sq. ft.) ÷ (8 yd. × 3 × 1$\frac{1}{2}$) = 13$\frac{3}{9}$ rolls.

34. $(5\frac{2}{3}$ ft. $+4$ ft.$) \times 2 \times 5 = 96\frac{2}{3}$ sq. ft., sides;
$5\frac{2}{3}$ ft. $\times 4 = 22\frac{2}{3}$ sq. ft., bottom;
$\$.12 \times 5 \times (96\frac{2}{3} + 22\frac{2}{3}) = \$71.60$, *Ans.*

35. $12\frac{11}{12}$ ft. $\times 4 \times 9\frac{1}{4} = 477\frac{11}{12}$ sq. ft., sides;
$6\frac{1}{8}$ ft. $\times 2\frac{1}{3} \times 3 = 43\frac{1}{8}$ sq. ft., windows and door;
$\$.28 \times (477\frac{11}{12}$ sq. ft. $- 43\frac{1}{8}$ sq. ft.$) \div 9 = \$13.525$, *Ans.*

36. (46 ft. $\times$ 40) + 46 sq. ft., extra courses = 1886 sq. ft., area;
1886 sq. ft. $\times$ 144 $\div$ (4 in. $\times$ 6) = 11316 shingles, *Ans.*

37. $\$.30 \times (\overline{21\frac{2}{3}}$ ft. $+ 14\frac{2}{3}$ ft. $\times 2 \times 10.5) \div 9 = \$25.55$, *Ans.*

38. \$15.375 $\times$ (64.75 ft. $\times$ 45) $\div$ 100 = \$447.96, *Ans.*

Art. 467.

1. 120 rd. $\times$ 120 $\div$ 160 sq. rd. = 90 A., *Ans.*

2. 16 A. $\times$ 160 $\div$ 80 rd. = 32 rd., width, *Ans.*

3. 6.5 mi. $\times$ 5.5 $\times$ 640 $\div$ 120 A. $= 190\frac{2}{3}$ farms, *Ans.*

4. 121 yd. $\times$ (75 ft. $\div$ 3 ft.) $\div$ 4840 sq. yd. = .625 A., *Ans.*

5. $(\overline{435 \text{ A.} \times 160} + 96$ P.$) \div 264 = 264$ rd., *Ans.*

6. \$42.75 $\times$ (189.5 rd. $\times$ 150) $\div$ 160 = \$7594.80, *Ans.*

7. 70 rd. $\times$ 70 = 4900 sq. rd.; 5 A. = 800 sq. rd.;
4900 sq. rd. $-$ 900 sq. rd. = 4000 sq. rd.; $\frac{4000}{4900} = \frac{40}{49}$.

8. 5 A. $\times$ 160 $\div$ (10 A. $\times$ 160 $\div$ 50) = 25 rd., length, *Ans.*

9. $(\$2.75 \times \overline{160 + 40 \times 2}) - (\$2.75 \times 80 \times 4) = \$220$ less.

10. \$100 $\times$ (16 ch. $\times$ 15) $\div$ 10 sq. ch. = \$2400, cost;
\$50 $\times$ (16 ch. $\times$ 15 $\times$ 16) $\div$ (6 rd. $\times$ 5) = \$6400, sale;
\$6400 $-$ \$2400 = \$4000, gain, *Ans.*

Art. 468.

1. 23040 A.÷288=80.; $\frac{80}{640}$ A.=$\frac{1}{8}$ Sec., *Ans.*

2. ($\frac{1}{2}$ mi.×4×320÷2 rd.)×3×6=5760 rails;
$40×5.76=$230.40, *Ans.*

3. $2.25×320=$720; $4.375×160=$700;
$700−($720÷2)=$340, gain, *Ans.*

4. 160 A.+80 A.=240 A. $\frac{240}{640}$ A.=$\frac{3}{8}$ Sec., *Ans.*

5. $2×320=$640, purchase; $2.75×80=$220;
$3.50×40=$140; $3.84×80=$307.20;
320 A.−(80 A.+40 A.+80 A.)=120 A. left;
$220+$140+$307.20−$640=$27.20, gain, *Ans.*

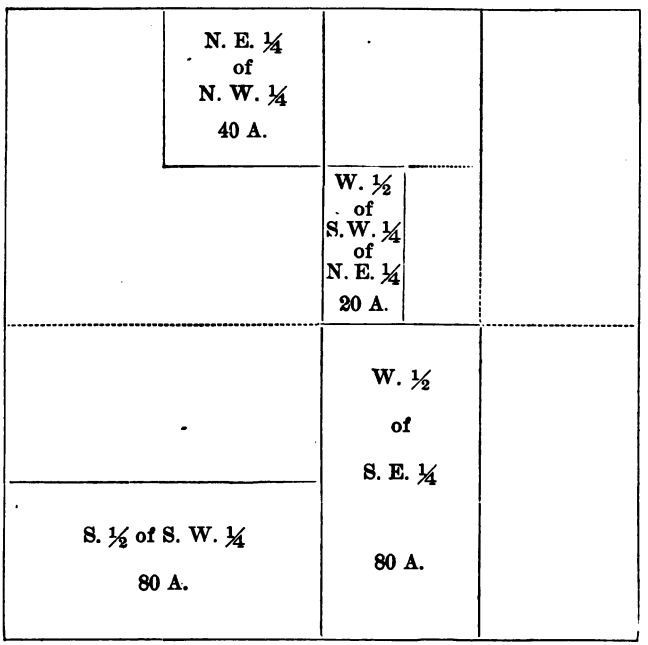
HALF-SECTION.

<table>
<tr><td>N. ½
of
S. W. ¼
80 A.</td><td>N. W. ¼
of
S. E. ¼
40 A.</td><td rowspan="2">E. ½
of
S. E. ¼

80 A.</td></tr>
<tr><td colspan="2">Remainder of S. ½ of Sec. 4.</td></tr>
</table>

6. $1.25 × 640 = $800, purchase;
$2.50 × 80 = $200; $1.75 × 40 = $70;
$2 × 80 = $160; $3 × 20 = $60;
640 A. − (80 A. + 40 A. + 80 A. + 20 A.) = 420 A. left;
$2.25 × 420 = $945;
$945 + $200 + $70 + $160 + $60 − $800 = $635, gain.

SECTION.



Art. 474.

1. 6 ft $4 × 4 = 96$ cu. ft., *Ans.*

2. 9 ft $4 × 3 = 108$ cu. ft., *Ans.*

3. 1224 cu. ft. $\div$ (12 ft. $\times$ 12) = $8\frac{1}{2}$ ft., *Ans.*

4. $8\frac{1}{2}$ ft. $\times$ 6 $\times$ $4\frac{1}{3}$ = 221 cu. ft., *Ans.*

5. (36 ft. $\times$ 24 $\times$ 6.5) $\div$ 27 cu. ft. = 208 cu. yd., *Ans.*

6. $4\frac{2}{3}$ ft. $\times$ $4\frac{3}{4}$ $\times$ $4\frac{1}{4}$ = 3 cu. yd. 26 cu. ft., 297 cu. in.

7. $20\frac{7}{12}$ ft. $\times$ $3\frac{1}{3}$ $\times$ $2\frac{11}{12}$ = 7 cu. yd. 11 cu. ft. 200 cu. in.

8. 5 ft. $\times$ 5 $\times$ 6.4 = 5 cu. yd. 25 cu. ft., *Ans.*

9. 6 cu. ft. $\div$ (8 ft. $\times$ 8) = $1\frac{1}{8}$ in., *Ans.*

10. 20 cu. ft. $\div$ (36 ft. $\times$ $\frac{5}{6}$) = 8 in., *Ans.*

11. 13 cu. yd. 14 cu. ft. 9 cu. in. = $365\frac{9}{16}$ cu. ft.;
$365\frac{9}{16}$ cu. ft. $\div$ ($7\frac{1}{4}$ ft. $\times$ $5\frac{1}{2}$) = 9 ft. 2 in., *Ans.*

12. $24\frac{3}{4}$ ft. $\times$ $18\frac{1}{3}$ $\times$ $10\frac{2}{3}$ = 4840 cu. ft., *Ans.*

13. (30 ft. $\times$ 8 $\times$ $6\frac{1}{2}$) $\div$ 128 cu. ft. = $12\frac{3}{16}$ Cd., *Ans.*

14. (67.5 Cd. $\times$ 128) $\div$ (90 $\times$ 12) = 8 ft., *Ans.*

15. \$3.75 $\times$ ($\overline{12.5 \text{ ft.} \times 8 \times 4.5} \div 128$ cu. ft.) = \$13.183.

16. \$.42 $\times$ ($\overline{45 \text{ ft.} \times 28 \times 8.5} \div 27$ cu. ft.) = \$166.60, *Ans.*

17. 128 cu. ft. $\div$ (3 $\times$ $5\frac{1}{3}$) = 8 ft., *Ans.*

18. (32 in. $\times$ 24 $\times$ 15) $\div$ (8 in. $\times$ 6 $\times$ 3) = 80 cans, *Ans.*

19. \$3.50 $\times$ ($\overline{50 \text{ ft.} \times 25 \times 12} \div 128$ cu. ft.) = \$410.156.

20. (1000 cu. ft. $\div$ 200) $\div$ ($\frac{5}{6}$ $\times$ $\frac{1}{4}$) = 24 ft., *Ans.*

Art. 477.

2. 8 in. + ($\overline{.25 \times 2} \div 2$) = 8.25 in., length;
2 in. + ($\overline{.25 \times 2} \div 2$) = 2.25 in., thickness;
8.25 in. $\times$ 2.25 = 18.5625 sq. in., area;
16.5 in. $\div$ 4 = 4.125 in., width;
18.5625 sq. in. $\times$ 4.125 = 76.5703125 cu. in. in a brick;
1728 cu. in. $\div$ 76.5703125 cu. in. = $22\frac{8}{11}$ br. in a ft.;
42 ft. $\times$ 24 $\times$ $1\frac{3}{8}$ $\times$ $22\frac{8}{11}$ = $31278\frac{6}{11}$ bricks, Ans.

3. (60 ft. × 16.5 × 1.5) ÷ 24.75 cu. ft. = 60 Pch., *Ans.*

4. (120 ft. × 6.75 × 1.5) ÷ 24.75 cu. ft. = $49\frac{1}{11}$ Pch., *Ans.*

5. $8.5 + (\overline{.25 \times 2} \div 2) = 8.75$ in., length;
$2.25 + (\overline{.25 \times 2} \div 2) = 2.5$ in., thickness;
8.75 in. × 2.5 = 21.875 sq. in., area;
12.375 in. ÷ 3 = 4.125 in., width;
21.875 sq. in. × 4.125 = 90.234375 cu. in. in a brick;
1728 cu. in. ÷ 90.234375 cu. in. = 19.15 br. in a cu. ft.;
$\overline{(36 \text{ ft.} - 1\frac{1}{32} \text{ ft.} \times 24 \times 1\frac{1}{32} \times 4)} - 224$ cu. ft. = 3237.906 cu. ft., in the walls;
3237.906 cu. ft. × 19.15 = 62006 bricks, *Ans.*

6. \$.56 × (240 ft. × 38 × 8.5) ÷ 27 cu. ft. = \$1607.82, *Ans.*

7. $\overline{(41\frac{1}{4} \times 2 + \overline{33 \times 2})} \times 8 \times 1\frac{1}{3} = 1782$ cu. ft.;
1782 ÷ 24.75 = 72 perches;
(41.25 × 33 × 8) ÷ 27 = $403\frac{1}{3}$ l.; \$.50 × $403\frac{1}{3}$ = \$$201\frac{2}{3}$;
\$3.75 × 72 + \$$201\frac{2}{3}$ = \$$471.66\frac{2}{3}$, *Ans.*

8. $(\overline{16 \times 2} + \overline{12 \times 2}) \times 16\frac{1}{2} = 924$ ft.;
Allow 6 ft. for corners, 924 − 6 = 918 ft.;
918 × 6 × 3 = 16524 cu. ft.;
16524 cu. ft. ÷ $24\frac{3}{4}$ = $667\frac{7}{11}$ perches, *Ans.*

9. \$.42 × (650 ft. × 72 × 4.5) ÷ 27 cu. ft. = \$3276, *Ans.*

10. $8.25 + (\overline{.25 \times 2} \div 2) = 8.5$ in., length;
$2.375 + (\overline{.25 \times 2} \div 2) = 2.625$ in., thickness;
8.5 in. × 2.625 = 22.3125 sq. in., area;
17 in. ÷ 4 = 4.25 in., width;
22.3125 sq. in. × 4.25 = 94.828125 cu. in. in a brick;
1728 cu. in. ÷ 94.828125 cu. in. = 18.222 + br. in a ft.;
60 ft. × $21\frac{7}{8}$ × $1\frac{5}{32}$ = 1859.375 cu. ft., in the wall;
1859.375 cu. ft. × 18.222 = 33881.53125 bricks;
\$12.50 × 33.88153125 = \$423.52, *Ans.*

11. $\overline{37\frac{1}{2}\text{ ft.} + 26\text{ ft.}} \times 2 = 127$ ft., entire length;
Allowing 8 ft. for corners, 127 ft. $-$ 8 ft. $=$ 119 ft.;
119 ft. $\times 9 \times 2 = 2142$ cu. ft. $= 86.545$ perches;
\$3.85 $\times$ 86.545 $=$ \$333.20, *Ans.*

Art. 481.

3. (16 ft. $\times$ 10 $\times$ 4) $\div$ 12 $= 53\frac{1}{3}$ sq. ft., *Ans.*

4. (17 ft. $\times$ 11 $\times$ 3 $\times$ 2) $\div$ 12 $= 93\frac{1}{2}$ sq. ft., *Ans.*

6. \$.06 $\times$ (12 ft. $\times \overline{17\text{ in.} + 11\text{ in.}} \div 2 \times 5) \div 12 =$ \$4.20.

7. (15 ft. $\times$ 16 $\times$ 3.5 $\times$ 10) $\div$ 12 $= 700$ ft.;
\$2.25 $\times$ 7 $=$ \$15.75, *Ans.*

9. (15 ft. $\times$ 20 $\div$ 12) $-$ 15 ft. $=$ 10 ft.;
(144 sq. in. $\times$ 10 $\div$ 20) $\div$ 12 $=$ 6 ft., *Ans.*

11. 5 ft. 3 in. $=$ 63 in.; (144 sq. in. $\times$ 7) $\div$ 63 $=$ 16 in., *Ans.*

12. (26 ft. $\times$ 6 $\times$ 9 $\times$ 3) $\div$ 12 $=$ 127 board ft.;
\$1.75 $\times$ 127 $\div$ 100 $=$ \$6.1425, *Ans.*

13. (14 ft. $\times$ 3 $\times$ 4 $\times$ 8) $\div$ 12 $=$ 112 board ft.;
\$9.50 $\times$ 112 $\div$ 1000 $=$ \$1.064, *Ans.*

15. $\overline{(1728\text{ cu. in.} \times 15} \div \overline{10 \times 16)} \div 12 = 13\frac{1}{2}$ ft., *Ans.*

16. (4 ft. $\times \overline{2\text{ ft. } 6\text{ in.} - 2\text{ in.}} \times 2) \div 12 = 18\frac{2}{3}$ sq. ft., sides;
$\overline{(3\text{ ft. } 6\text{ in.} - 2\text{ in.}} \times 28 \times 2) \div 12 = 15\frac{1}{3}$ sq. ft., ends;
(4 ft. $\times$ 42 $\times$ 2) $\div$ 12 $=$ 28 sq. ft., covers;
$18\frac{2}{3}$ sq. ft. $+ 15\frac{1}{3}$ sq. ft. $+$ 28 sq. ft. $= 62\frac{2}{3}$ sq. ft., *Ans.*

17. (12 ft. $\times$ 11 $\times$ 36) $\div$ 12 $=$ 396 board ft.;
\$2.50 $\times$ 396 $\div$ 100 $=$ \$9.90, *Ans.*

18. (14.5 ft. $\times$ 10 $\times$ 3 $\times$ 16) $\div$ 12 $=$ 580 board ft.;
\$16.25 $\times$ .58 $=$ \$9.425, *Ans.*

19. (36 ft. × 10 × $\overline{12 \text{ in.} + 9 \text{ in.}} \div 2) \div 12 = 315$ board ft.;
315 board ft. $\div 12 = 26\frac{1}{4}$ cu. ft., *Ans.*

20. (16 ft. × 10 × 124) $\div 12 = 1653\frac{1}{3}$ board ft.;
(14 ft. × 16 × 120) $\div 12 = 2240$ board ft.;
(15 ft. × 12 × 2.5 × 40) $\div 12 = 1500$ board ft.;
(18 ft. × 10 × 3 × 96) $\div 12 = 4320$ board ft.;
(12 ft. × 4 × 3 × 60) $\div 12 = 720$ board ft.;
$15 × 1.653\frac{1}{3} = \$24.80$; $16.50 × 2.24 = \$36.96$;
$18.75 × 1.5 = \$28.125$; $14 × 4.32 = \$60.48$;
$12.50 × .72 = \$9$;
$24.80 + $36.96 + $28.125 + $60.48 + $9 = \$159.365.

21. $30 × (48 × 25 × $1\frac{1}{4}$ × 2) $\div 1000 = \$90$, *Ans.*

22. $\overline{16 \text{ ch.} + 8 \text{ ch.}} × 4 × 16\frac{1}{2} × 2) \div 8$ ft. $= 396$ posts;
$\overline{16 \text{ ch.} + 8 \text{ ch.}} × 4 × 16\frac{1}{2} × 2) \div 16$ ft. $= 198$ panels;
16 ft. × $(12 + 6 + \overline{9 × 3}) \div 12 = 60$ sq. ft. in a panel;
60 sq. ft. × 198 = 11880 sq. ft., lumber;
($25 × 3.96) + ($14.80 × 11.88) = $274.824, cost, *Ans.*

Art. 485.

1. (6 ft. × 5 × 4 × 1728) $\div 2150.42 = 96.423$ bu., *Ans.*

2. 123 bu. × 2150.42 $\div 1728 = 159.29+$ cu. ft., *Ans.*

3. (8 ft. × $6\frac{1}{2}$ × $3\frac{1}{3}$ × 1728) $\div 2150.42 = 139.144+$ bu.

5. (324 bu. + 81 bu.) $\div (6 × 4.5) = 15$ ft., *Ans.*

6. (900 bu. + 225 bu.) $\div (12 × 10) = 9\frac{3}{8}$ ft., *Ans.*

7. (100.8 bu. + 25.2 bu.) $\div (7 × 6) = 3$ ft., *Ans.*

8. (8.5 ft. × 4.25 × 3.75) $- \frac{1}{5} = 108.375$ bu., *Ans.*

9. (10 ft. × 6 × 4) $- \frac{1}{3} = 192$ bu., oats, *Ans.*
192 bu. $- \frac{1}{3} = 153\frac{3}{5}$ bu., potatoes, *Ans.*

10. (12 ft. × 3 × 2.5) − $\frac{1}{5}$ = 72 bu., barley, *Ans.*
72 bu. − $\frac{1}{5}$ = 57$\frac{3}{5}$ bu., apples, *Ans.*

11. \$2 × (20 ft. × 12 × 5 − $\frac{1}{5}$) = \$1920, *Ans.*

12. \$1.375 × (7 ft. × 6 × 5 − $\frac{1}{5}$) × $\frac{3}{4}$ = \$173.25, *Ans.*

13. \$1.78 × (10 ft. × 6 × 5 − $\frac{1}{5}$) ÷ .48 = \$205.056, *Ans.*

14. (15 ft. × 7$\frac{1}{3}$ × 8 − $\frac{1}{5}$) − $\frac{1}{5}$ = 563$\frac{1}{5}$ bu. of ears;
\$.92 × 563$\frac{1}{5}$ ÷ 2 = \$259.072, *Ans.*

15. (10 ft. × 5 × 4) − $\frac{1}{5}$ = 160 bu.;
48 lb. × 160 ÷ 196 lb. = 39$\frac{2}{49}$ bbl., *Ans.*

16. (40 ft. × 30 × 20 × 58$\frac{1}{3}$) ÷ 2000 = 697$\frac{1}{2}$ tons, *Ans.*

17. \$1.50 × 12400 = \$18600, cost;
(12400 bu. ÷ 8 bu.) × 6 = 9300s., freight
(12400 bu. × 60 ÷ 100) × 12 = 89280s.;
(89280s. − 9300s. ÷ 20s.) × 4.8665 = \$19461.1335;
\$19461.1335 − \$18600 = \$861.13 gain, *Ans.*

18. (17 ft. × 6 × 3) ÷ 36 cu. ft. = 8$\frac{1}{2}$ tons, *Ans.*

19. \$6.75 × (6 ft. × 4 × 5.75) ÷ 34.5 cu. ft. = \$27, *Ans.*

20. (10 yd. × 6 × 6 × 27) ÷ 36 cu. ft. = 270 tons;
\$5.50 × 270 = \$1485, *Ans.*

21. \$5.90 × (7 ft. × 5 × 5 ÷ 2) ÷ 35 cu. ft. = \$14.75, *Ans.*

Art. 490.

2. (4 ft. × 3 × 1$\frac{2}{3}$ × 1728) ÷ 231 cu. in. = 149$\frac{7}{11}$ gal., *Ans.*

3. (43659 cu. in. ÷ 231 cu. in.) ÷ 31$\frac{1}{2}$ gal. = 6 bbl., *Ans.*

4. (48 hhd. × 63 × 231) ÷ 1728 cu. in. = 404$\frac{1}{4}$ cu. ft.

5. $\overline{(11 \text{ ft.} \times 6 \times 7 \times 1728} \div 231 \text{ cu. in.}) \div 63 \text{ gal.} = 54\frac{6}{7}$ hhd., *Ans.*

6. 6 ft. $\times 3 \times 1.75 \times 62.5 = 1968.75$ pounds, *Ans.*

7. (22.5 ft. $\times 3.25 \times 6.4 \times 1728) \div 231$ cu. in. $= 3500\frac{8}{11}$ gal., *Ans.*

8. (32 hhd. $\times 63 \times 231) \div (6$ ft. $\times 8 \times 144) = 5$ ft. $7\frac{3}{8}$ in.

9. (189.5 gal. $\times 268.8$) $-$ (189.5 gal. $\times 231) = 7163.1$ cu. in., *Ans.*

10. 1728 cu. in. $\div 231$ cu. in. $= 7.4805+$ gal., *Ans.*

11. (6.5 ft. $\times 4 \times 3.5 \times 1728) \div 231$ cu. in. $= 680\frac{8}{11}$ gal.;
$62\frac{1}{2}$ lb. $\times 91 = 5687\frac{1}{2}$ pounds, *Ans.*

12. (67.2 cu. in. $\times 64) - (57.75$ cu. in. $\times 64) = 604.8$ cu. in.

13. 10 bu. $\times 2150.42 = 21504.2$ cu. in.;
($\$.25 \times 21504.2$ cu. in. $\div 57.75$ cu. in.) $-$ ($\$5 \times 10) =$ $\$43.09$, *Ans.*

14. (5 ft. $\times 4 \times 3 \times 1728) \div 231$ cu. in. $= 448\frac{4}{11}$ gal.;
1 hr. 30 min. $= 90$ min.; $448\frac{4}{11} \div 90 = 4\frac{7}{11}$ gal., *Ans.*

15. (5000 gal. $\times 4 \times 57\frac{3}{4}) \div (67\frac{1}{2}$ cu. in. $\times 8 \times 4) = 537\frac{1}{64}$ bu., *Ans.*

16. (7 ft. $\times 12 \times 9 \div 2) \times 62\frac{1}{2} = 23625$ pounds, *Ans.*

17. (40 ft. $\times 20 \times 8 \times 1728 \div 2) \div 231$ cu. in. $= 23937.66+$ gal.; $\$.06 \times (23937.66$ gal. $\div 63) =$ $\$22.797$, *Ans.*

18. $24\frac{3}{8}$ ft. $\times 12\frac{3}{4} = 314\frac{1}{2}$ cu. ft.;
314.5 cu. ft. $\times 1728 \div 231$ cu. in. $= 2352\frac{8}{11}$ gal., *Ans.*

19. $(7\frac{1}{4}$ ft. $\times 3\frac{3}{8} \times 2\frac{5}{6} \times 1728) \div 277.274$ cu. in. $= 469.39$ gal., *Ans.*

Art. 493.

3. 9 lb. 10 oz.=154 oz.; 154 oz.×437.5=67375 gr.;
67375 gr.÷480 gr.=11 lb. 8 oz. 7 pwt. 7 gr., *Ans.*

4. 16 lb. 8 oz. 10 pwt. 12 gr.=200.525 oz.;
200.525 oz.×480=96252 gr.;
96252 gr.÷437.5 gr.=13 lb. $12\frac{4}{175}$ oz., *Ans.*

5. 2 lb. 14 oz.=46 oz.; 46 oz.×437.5=20125 gr.;
20125 gr.÷480 gr.=$41\frac{82}{96}$ oz.;
\$1.80×$41\frac{82}{96}$=\$75.46$\frac{7}{8}$, *Ans.*

6. 6 lb.=96 oz.; 96 oz.×437.5÷480 gr.=87$\frac{1}{2}$ oz., *Ans.*

7. 8 lb.=128 oz.; 128 oz.×437.5÷480 gr.=116$\frac{8}{9}$ oz.;
(\$16.25×116$\frac{8}{9}$÷12 oz.)−(\$12.50×8)=\$57.986.

8. 42$\frac{3}{8}$ lb.=678 oz.; 678 oz.×437.5=296625 gr.;
42.375 lb.=508.5 oz.; 508.5 oz.×480=244080 gr.;
296625 gr.−244080 gr.=52545 gr., *Ans.*

SECOND PART.

Art. 512.

2. 695 lb.×.35=243.25 lb., *Ans.*

3. \$8428×.75=\$6321, *Ans.*

4. £2105×.125=£263.125, *Ans.*

5. 8736 bu.×.33$\frac{1}{3}$=2912 bu., *Ans.*

6. \$35000×.005=\$175, *Ans.*

7. \$171.24×1.20=\$205.488, *Ans.*

8. 312.8 rd.×.045=14.076 rd., *Ans.*

9. \$5738 × 1.05 = \$6014.40, *Ans.*

10. \$3140.75 × 1.0125 = \$3180+, *Ans.*

11. $2\frac{2}{3}$ mi. × 1.075 = 2 mi. 277 ft. $5\frac{1}{2}$ in., *Ans.*

12. 400 ft. × $.96\frac{2}{3}$ = $386\frac{2}{3}$ ft., *Ans.*

13. $25\frac{4}{7}$ bu. × .84 = 21.6 bu., *Ans.*

14. $\frac{7}{8}$ ton × .25 = $437\frac{1}{2}$ lb., *Ans.*

15. 16400 men × .0075 = 123 men, *Ans.*

16. $\frac{5}{6}$ yr. × $.00\frac{2}{3}$ = $.005\frac{5}{9}$ yr., or $\frac{1}{180}$ yr., *Ans.*

17. $\frac{14}{32}$ hhd. × .00625 = .004 hhd., *Ans.*

18. 196 lb. × 1.35 = 264.6 lb., *Ans.*

19. \$4500 × (.80 + .75 + .625) = \$9896.25, *Ans.*

20. \$1600 × (.18 + $.08\frac{1}{3}$ + .16) = \$677.33 = expenses;
\$1600 − \$677.33 = \$922.67 = am't saved.

21. .8 mill × .65 = .52 of mill = part still owned.
\$24640 ÷ .35 × .65 = \$45760, value of part still owned.

22. \$5420 × (1 − $.\overline{15} + .\overline{17} + .04$) = \$3902.40, *Ans.*

Art. 515.

2. 75 ÷ 300 = .25 = 25%, *Ans.*

3. 16.5 ÷ 66 = .25 = 25%, *Ans.*

4. \$21.60 ÷ \$20 = 1.08 = 108%, *Ans.*

5. \$.90 ÷ \$18 = .05 = 5%, *Ans.*

6. 80 lb. ÷ 560 lb. ÷ $.14\frac{2}{7}$ = $14\frac{2}{7}$%, *Ans.*

7. 49 mi. ÷ 980 mi. = .05 = 5%, *Ans.*

8. \$26.40 ÷ \$480 = .055 = $5\frac{1}{2}$%, *Ans.*

9. *120 A.* ÷ *192* A. = .625 = $62\frac{1}{2}$%, *Ans.*

10. 10.99 mi.÷15 mi.=.7326=73$\frac{4}{15}$%, *Ans.*

11. 5 gal. 3 qt.÷46 gal. = 5.75 gal.÷46 gal.=.125 = 12$\frac{1}{2}$%, *Ans.*

12. \$.30÷\$4=.075=7$\frac{1}{2}$%, *Ans.*

13. 4 bu. 2 pk. 6 qt.÷6 bu. 1 pk.=4.6875 bu.÷6.25 bu. =.75=75%, *Ans.*

14. 448 da.÷5600 da.=.08=8%, *Ans.*

15. 5 lb. 10 oz.÷15 lb.=5.625 lb.÷15 lb.=.375=37$\frac{1}{2}$%.

16. 13.5÷225=.06=6%, *Ans.*

17. $\frac{21}{35}$÷$\frac{56}{100}$=1$\frac{1}{8}$=112$\frac{1}{2}$%, *Ans.*

18. 3$\frac{5}{8}$÷18$\frac{1}{8}$=.2=20%, *Ans.*

19. 22$\frac{4}{5}$÷182.4=.125=12$\frac{1}{2}$%, *Ans.*

20. 100%−(25%+$\frac{1}{3}$ of 75%)=50%, *Ans.*

21. \$9828÷\$15120=.65=65%, *Ans.*

Art. 518.

2. \$54÷.15=\$360, *Ans.*

3. \$18.75÷.025=\$750, *Ans.*

4. 4.56 A.÷.05=91.2 A., *Ans.*

5. 39.6 lb.÷.075=528 lb., *Ans.*

6. 828÷1.20=690, *Ans.*

7. 6119÷1.055=5800, *Ans.*

8. .43÷.71$\frac{3}{7}$=.6, *Ans.*

9. 31$\frac{1}{4}$÷.31$\frac{1}{4}$=100, *Ans.*

10. \$281.25÷.375=\$750, *Ans.*

11. \$4578 ÷ .84 = \$5450, *Ans.*

12. $37\frac{1}{2}$ bu. ÷ .0625 = 600 bu., *Ans.*

13. 1260 bbl. ÷ .125 = 10080 bbl., *Ans.*

14. 800 bu. × .25 ÷ .025 = 8000 bu., *Ans.*

15. 3150 bu. ÷ $\overline{100\% - 30\%}$ = 4500 bu., *Ans.*

16. \$250 ÷ $\overline{25\% \times 33\frac{1}{3}\%}$ = \$3000, *Ans.*

17. \$5860 ÷ $\overline{45\% \times 16\frac{2}{3}\%}$ = \$78133$\frac{1}{3}$, *Ans.*

18. \$295.12 ÷ .13$\frac{1}{3}$ = \$2213.40, A's money.
\$2213.40 × .04$\frac{2}{3}$ ÷ .08 = \$1291.15, B's money.
\$2213.40 − \$1291.15 = \$922.25, *Ans.*

Art. 520.

2. 2950 ÷ 1.18 = 2500, *Ans.*

3. \$6900 ÷ 1.15 = \$6000, *Ans.*

4. 2640 ÷ .88 = 3000, *Ans.*

5. \$1000 ÷ .80 = \$1250, *Ans.*

6. \$4810 ÷ .65 = \$7400, *Ans.*

7. 3800 ÷ 1.12 = 3392.86, *Ans.*

8. 39600 ÷ 1.10 = 36000, *Ans.*

9. \$2616.25 ÷ 1.15 = \$2275, *Ans.*

10. 1098 bu. ÷ 1.22 = 900 bu., *Ans.*

11. 740 ÷ .925 = 800, *Ans.*

12. 312 A. ÷ .96 = 325 A., *Ans.*

13. \$2281.60 ÷ .92 = \$2480, *Ans.*

14. *\$234.625 ÷ .625* = \$375.40, *Ans.*

15. $4563.20 ÷ .92 ÷ 160 = $31, *Ans.*

16. $2008.80 ÷ .93 ÷ 48 = $45, *Ans.*

17. $4910.976 ÷ $\overline{1.10 \times 1.015}$ = $4398.55, *Ans.*

18. $3500 ÷ $\overline{100\% - 60\%}$ = $8750, *Ans.*

19. $6970 ÷ $\overline{1 + 1.05}$ = $3400 = first year's profits.
$3400 × 1.05 = $3570 = second year's profits.

20. $(\overline{\$2500 \div 1.20} + \overline{\$2500 \div .80}) - \$5000 = \$208.33\frac{1}{3}$.

Art. 530.

2. $1745 × .20 = $349, *Ans.*

3. $3120 × .27 = $842.40, *Ans.*

4. $2545.50 × .25 = $636.375, *Ans.*

5. $2560.75 × .08 = $204.86, *Ans.*

6. $58 × 25 × .175 = $253.75, *Ans.*

7. $6840 × .265 − $375 = $1437.60, *Ans.*

8. $1.84 × 1000 × .16⅔ = $306.67, *Ans.*

9. $5.125 × 128 × .22 = $144.32, *Ans.*

10. $7.65 × 3840 × .375 = $11016, *Ans.*

11. $450 ÷ .75 × 1.25 − $450 = $300, *Ans.*

Art. 531.

3. $187.50 × 1.11 = $208.125, *Ans.*

4. $12.50 × .905 = $11.3125, *Ans.*

5. $.14 × 1.214 = $.16996, *Ans.*

6. $5.25 × 1.185 + $6.22125, Ans.

7. $3.50 × 1.25 = $4.375 ; $3.50 × .80 = $2.80, *Ans.*

8. $.625 × .85 = $.53125 ; $1.25 × .85 = $1.0625, *Ans.*

9. $\overline{\$86.04 + \$4.78} \times 1.20 \div 956 = \$.114$, *Ans.*

Art. 532.

3. $.095 — $.08 ÷ $.08 = 18¾%, *Ans.*

4. $1 — $.875 ÷ $1 = 12½%, *Ans.*

5. $330 — $275 ÷ $275 = 20%, *Ans.*

6. $1.60 — $1.25 ÷ $1.25 = 28%, *Ans.*

7. $72.96 — $9.12 = $63.84; $9.12 ÷ $63.84 = 14⅔%, *Ans.*

8. $425.98 + 134.52 = $560.50;
$134.52 ÷ $560.50 = 24%, *Ans.*

9. $\overline{\$.25 \times 20} - \$3 \div \$3 = 66\frac{2}{3}\%$, *Ans.*

10. $\$114.885 \div \overline{\$4.625 \times 108} = 23\%$, *Ans.*

11. ¾ — ½ ÷ ½ = 50%, *Ans.*

12. ⅘ — ½ ÷ ⅘ = 37½%, *Ans.*

13. 1 — ⅝ ÷ ⅝ = 60%, *Ans.*

Art. 533.

3. $1500 ÷ .16 = $9375, *Ans.*

4. $.88 ÷ .10 = $8.80, *Ans.*

5. $.06 ÷ .04 = $1.50, *Ans.*

6. $4.95 ÷ .35 = $14.14+, *Ans.*

7. $2500 ÷ .15 = $16666.66⅔, *Ans.*

8. $2000 ÷ .125 = $16000, A's capital;
$500 ÷ .05 = $10000, B's capital, *Ans.*

Art. 534.

2. $\$6 \div .875 = \$6.86$, *Ans.*

3. $\$.96 \div 1.28 = \$.75$, *Ans.*

4. $\$5.40 \div 1.10 = \$4.91$, *Ans.*

5. $\$.16 \div .80 = \$.20$. *Ans.*

6. $\$207.48 \div .85 = \$244.094$, *Ans.*

7. $\$125 \div .75 \times 1.10 = \$183.33\frac{1}{3}$, *Ans.*

8. $\$550 \div .83\frac{1}{3} \div 1.12\frac{1}{2} = \$586.64$, *Ans.*

9. $\$16000 \div \overline{1 \times 1.25 \times 1.25 \times 1.25 \times 1.25} = \$6553.60$.

Art. 535.

2. $\$1.12 \times 1.25 \div .95 = \$1.47$, *Ans.*

3. $\$120 \times 1.20 \div .96 = \$150$, *Ans.*

4. $\$.80 \div .75 = \$1.06\frac{2}{3}$, *Ans.*

5. $\$60 \times 1.20 \div .75 = \$96$, *Ans.*

Art. 547.

2. $\$13750 \times .0275 = \$378.125$, *Ans.*

3. $\$9384 \times .00875 = \$82.11$, *Ans.*

4. $\$.0175 \times 21680 = \$379.40$, *Ans.*

5. $\$.14625 \times 520 \times 250 \times .015 = \$285.19$, *Ans.*

6. $\$92.25 \times 175 \times .00125 = \$20.18$, *Ans.*

7. $\$9346.80 \times .0625 = \$584.175$, *Ans.*

8. $(\overline{\$3.25 \times 225} + \overline{\$4.50 \times 316}) \times .045 = \$96.90$, Ans.

Art. 548.

2. $165 ÷ $4950 = 3⅓%, *Ans.*

3. $63 ÷ $1260 = 5%, *Ans.*

4. $117.75 ÷ $7850 = 1½%, *Ans.*

5. $235.40 ÷ $\overline{\$.32 \times 26750}$ = 2¼%, *Ans.*

6. $125 ÷ $2500 = 5%, *Ans.*

7. $74.25 ÷ $\overline{\$.045 \times 26400}$ = 6¼%, *Ans.*

Art. 549.

2. $92.80 ÷ .03 = $2784, *Ans.*

3. $210 ÷ .06 = $3500, *Ans.*

4. $24 ÷ .0025 = $9600, *Ans.*

5. $135 ÷ .015 = $9000, *Ans.*

6. $72.03 ÷ .075 = $960.40, *Ans.*

Art. 550.

2. $3281.25 ÷ .875 = $3750, *Ans.*

3. $560 ÷ .96 = $583.33⅓, *Ans.*

4. ($23654.25 + $132) ÷ .9375 = $25372, *Ans.*

Art. 551.

2. $4908 ÷ 1.045 = $4696.65, *Ans.*

3. $3246.20 ÷ 1.02 = $3182.55, *Ans.*

4. $1511.25 ÷ 1.0075 = $1500, *Ans.*

5. $10701.24 ÷ 1.005 = $10648, *Ans.*

6. $6720.80 ÷ 1.05 = $6400.76 +, am't invested.
$6720.80 — $6400.76 = $320.04, commission, *Ans.*

7. $2523.40 ÷ 1.0175 ÷ $.08 = 31000 lb., *Ans.*

8. $10650 ÷ 1.0025 = $10623.44, *Ans.*

9. $45337.50 ÷ 1.025 = $44231.71, am't invested;
$45337.50 − $44231.70 = $1105.79, com., *Ans.*

10. $250.92 ÷ 1.02 ÷ $.15 = 1640 yd., *Ans.*

Art. 553.

1. 40 bu. 3¼ pk. ÷ .85 = 48 bu., *Ans.*

2. $3485 ÷ $\overline{1 + 1.05}$ = $1700, first year's profits;
$1700 × 1.05 = $1785, second year's profits, *Ans.*

3. B's = 100%; A's = 132% of B's;
B has $\frac{32}{132}$ less than A = $24\frac{8}{33}$%, *Ans.*

4. $1.40 − $1.25 × 450 = $67.50, gain;
$15 ÷ $1.25 = .12 = 12%, gain, *Ans.*

5. $1.125 × 728 ÷ $\overline{.30 \times .50}$ ÷ ⅜ × ⅝ = $3640, *Ans.*

6. $47649 ÷ 1.16⅔ = $40842 = cost;
$47649 − $40842 = $6807, gain, *Ans.*

7. $37.50 ÷ .00125 = $30000, *Ans.*

8. ⅝ − ⅜ ÷ ⅝ = $\frac{13}{32}$ = 40⅝%, *Ans.*

9. $25000 × (.0025 + .01625) = $468.75, *Ans.*

10. 1 − (1 × 1.50 × .50) ÷ 1 = .25 = 25% loss, *Ans.*

11. $21000 − $\overline{\$14700 \div .88}$ ÷ $\overline{\$14700 \div .88}$ = .257 = 25.7%, *Ans.*

12. 1 ÷ .80 × .84 − 1 ÷ 1 = .05 = 5%, *Ans.*

13. $5250 × .9425 = $4948.125, *Ans.*

14. $\left(\frac{\$13680}{4}\times 1.15\right)+\left(\frac{\$13680}{3}\times 1.1875\right)+$
$\left(\frac{\$13680}{6}\times 1.20\right)+\left(\frac{\$13680}{4}\times 1.33\frac{1}{3}\right)-\$13680=\$2964$, gain; $\$2964\div\$13680=.21\frac{2}{3}=21\frac{2}{3}\%$, gain, *Ans.*

Marking Price.

15.
$\$ .12\times 1.25=\$ .15$	;	$\$ .15\times 450=\$ 67.50$
$3.25\times 1.25=\$4.0625$	;	$4.0625\times 65=\ 264.06$
$.20\times 1.25=\$ .25$	;	$.25\times 244=\ 61.$
$7.36\times 1.25=\$9.20$	;	$9.20\times 25=\ 230.$
$.70\times 1.25=\$ .875$	;	$.875\times 144=\ 126.$
$1.00\times 1.25=\$1.25$	;	$1.25\times 50=\ 62.50$
		Total at marked price $=\$811.06$

$\$811.06\times .90=\$729.96$, am't received, *Ans.*

16.
$\$ .12\times 1.15\times .945\times 450=\$ 58.68$
$3.25\times 1.15\times .945\times 65=\ 229.57$
$.20\times 1.15\times .945\times 244=\ 53.03$
$7.36\times 1.15\times .945\times 25=\ 199.96$
$.70\times 1.15\times .945\times 144=\ 109.54$
$1.00\times 1.15\times .945\times 50=\ 54.34$
$\$705.12$, *Ans.*

17. $\$9.40\times 18.75\times .975-\$16.75=\$155.09$, *Ans.*

18. $\$7125\div 1.025\div\$.11\frac{1}{4}=61788.6$ lb., *Ans.*

19. $\$.75\div .1875\times .31\frac{1}{4}-18\frac{3}{4}=\$.50$, *Ans.*

20. $\$6.80\times 1000=\$6800$; $\$1.20\times 3000=\$3600$.
$(\$6800\times .015)+(\$.01\times 3000)=\$132$, Com.;
$\$.05-1000=\$50$, Storage;
$\$6800+\$3600+\$132+\$50=\$10582$, am't to bal. *books.*

21. $.125 \times 28000 - (\$3252.89 + \$45.86) \div \$3500 = .0575 = 5\frac{3}{4}\%$, *Ans.*

22. $ .11$\frac{1}{4}$ × 312 =	$35.10	$ .12$\frac{1}{2}$ × 312 =	$39.
.14 × 96 =	13.44	.14$\frac{1}{8}$ × 96 =	13.56
1.12$\frac{1}{2}$ × 84 =	94.50	1.10 × 84 =	92.40
.10$\frac{3}{4}$ × 60 =	6.45	.13 × 60 =	7.80
.24$\frac{1}{4}$ × 110 =	26.675	.22$\frac{1}{2}$ × 110 =	24.75
.08$\frac{3}{8}$ × 184 =	15.41	.07$\frac{1}{2}$ × 184 =	13.80
Cost =	$191.575	Am't of sales =	$191.31

$191.31 × .955 = $182.70, net proceeds.
$191.575 − $182.70 = $8.875, loss, *Ans.*
$8.875 ÷ $191.575 = .046 + = 4$\frac{3}{5}$ +%, loss, *Ans.*

23. $3.81 × 2400 − ($4.8665 × .5 × 2400 + $255) = $3049.20, gain, *Ans.*
$3049.20 ÷ $6094.80 = .50 = 50% +, gain, *Ans.*

Art. 567.

2. $450 × .06 × 3.75 = $101.25, Int.;
$450 + $101.25 = $551.25, Am't.
$450 × .07 × $\frac{8}{3}$ = $21, Int.; $450 + $21 = $471, A'mt.

3. $247 × .055 × 5.25 = $71.32, Int.;
$247 + $71.32 = $318.32, A'mt.
$247 × .08 × $\frac{5}{8}$ = $16.47, Int.;
$247 + $16.47 = $263.47, A'mt, *Ans.*

4. $500 × .10 × 4$\frac{1}{8}$ = $208.33, Int.;
$500 + $208.33 = $708.33, A'mt.
$500 × .05 × $\frac{11}{12}$ = $22.92, Int.;
$500 + $22.92 = $522.92, Am't, Ans.

5. $\$36.40 \times .06 \times 1\frac{7}{12} = \$3.46$, at 6%;
$\$36.40 \times .07 \times 1\frac{7}{12} = \$4.03$, at 7%;
$\$36.40 \times .075 \times 1\frac{7}{12} = \$4.32$, at $7\frac{1}{2}$%, *Ans.*

6. $\$750.50 \times .05 \times 3\frac{1}{12} = \$115.70$, at 5%;
$\$750.50 \times .08 \times 3\frac{1}{12} = \$185.12$, at 8%;
$\$750.50 \times .09 \times 3\frac{1}{12} = \$208.26$, at 9%, *Ans.*

7. $\$1346.84 \times .0625 \times 2\frac{1}{3} = \$196.41$, at $6\frac{1}{4}$%, *Ans.*
$\$1346.84 \times .075 \times 2\frac{1}{3} = \$235.70$, at $7\frac{1}{2}$%, *Ans.*

8. $\$138.75 \times 10 \times 4\frac{1}{4} = \$58.97$, at 10%;
$\$138.75 \times .125 \times 4\frac{1}{4} = \$73.71$, at $12\frac{1}{2}$%, *Ans.*

9. $\$640 \times .07 \times 5\frac{1}{2} + \$640 = \$886.40$, *Ans.*

10. $\$56.64 \times .08 \times 3\frac{1}{4} + \$56.64 = \$71.37$, *Ans.*

11. $\$1040 \times .075 \times 1\frac{3}{4} + \$1040 = \$1176.50$, *Ans.*

12. From June 10, 1874, to Sept. 10, 1876—2 yr. 3 mo.;
$\$375 \times .08 \times 2\frac{1}{4} + \$375 = \$442.50$, *Ans.*

Art. 569.

2. $\$1.3725 \div 12 \times 18.3\frac{1}{3} \times 6 = \$12.58$, at 6%, *Ans.*
$\$1.3725 \div 12 \times 18.3\frac{1}{3} \times 4 = \$8.39$, at 4%, *Ans.*

3. $\$5.105 \div 12 \times 43.5 \times 5 = \$92.53$, at 5%, *Ans.*
$\$5.105 \div 12 \times 43.5 \times 8 = \$148.04$, at 8%, *Ans.*

4. $\$12.976 \div 12 \times 35.6 \times 7 = \$269.47$, at 7%, *Ans.*
$\$12.976 \div 12 \times 35.6 \times 7\frac{1}{2} = \$288.72$, at $7\frac{1}{2}$%, *Ans.*

5. $\$7.819 \div 12 \times 13.4 \times 7 = \$61.12$, *Ans.*

6. $\$30 \div 12 \times 11.7 \times 10 = \$292.50$, *Ans.*

7. $\$10.49 \div 12 \times 27.3 \times 6\frac{1}{2} + \$1049 = \$1204.12$, *Ans.*

8. $\$2.1675 \div 12 \times 41.3\frac{3}{4} \times 8 + \$216.75 = \$276.52$, Ans.

9. From Jan. 1, 1873, to May 10, 1875, is 2 yr. 4 mo. 9 da.; $\$2.50 \div 12 \times 28.3 \times 7 = \$41.27$, *Ans.*

10. From Aug. 20 to Dec. 18 is 3 mo. 28 da.;
$\$4.0860 \div 12 \times 3.9\frac{1}{3} \times 10 + \$408.60 = \$421.99$, *Ans.*

11. From March 1, 1873, to July 16, 1875 = 2 yr. 4 mo. 15 da.; $\$5.1562 \div 12 \times 28.5 \times 7 = \$85.72$, *Ans.*

12. $4000 cash $= \$4000$
$35.00 \div 12 \times 9 \times 6 + \$3500 = \$3657.50$
$26.00 \div 12 \times 18 \times 6 + \$2600 = \$2834$
$24.00 \div 12 \times 28 \times 6 + \$2400 = \$2736$ $\$13227.50.$

Art. 573.

2. $\$597.25 \times .038 = \$22.70$, *Ans.*

3. $\$418.75 \times .009\frac{1}{3} = \$3.84$, *Ans.*

4. $\$309.18 \times .124 = \$38.34$, *Ans.*

5. $\$1298 \times .187\frac{1}{2} = \$242.94$, *Ans.*

6. $\$2000 \times .159 = \$318$, *Ans.*

7. $\$4010 \times .067\frac{1}{2} = \$269.34$, *Ans.*

Art. 574.

NOTE.—Exact interest differs from ordinary interest only, when the *time is in days.*

2. $\$1600 \times .06 = \$96$ Int. for 1 year.
$\$1600 \times .06 \div 4 = \$24$ Exact int. for 3 mo.
$\$120$, *Ans.*

3. $\$648.40 \times .08 \times 1\frac{1}{4} = \$64.84$ Int. for $1\frac{1}{4}$ yr.
$\$648.40 \times .08 \div 365 \times 20 = \$2.84$ Int. for 3 mo. 20 da.
$= \$67.68$ Exact int. for 1 yr. 3 mo. 20 da.
$\$648.40 \times .078\frac{1}{3} \times \frac{4}{3} = \$67.72$ Int. by 6% method.
Difference $= \$.04$, Ans.

4. \$875.60 × .07 ÷ 365 × 63 = \$10.58, *Ans.*

5. From May 1 till Oct. 15 is 167 da.;
\$3000 × .06 ÷ 365 × 167 = \$82.36, *Ans.*

6. From Nov. 1 till Apr. 10 is 160 da.;
\$500 × .05 ÷ 365 × 160 = \$10.96, *Ans.*

Art. 575.

1. \$721.56 × .081⅜ = \$58.93, *Ans.*

2. \$54.75 × .184 × ⅚ = \$8.40, *Ans.*

3. \$1000 × .058 × ⅞ = \$67.67, *Ans.*

4. \$3046 × .039⅓ × ⅘ = \$159.745, *Ans.*

5. April 1 till Nov. 12 is 7 mo. 11 da.;
\$1821.50 × .036⅝ = \$67.09, *Ans.*

6. Jan. 15 till Aug. 1 = 6 mo. 16 da.;
\$700 × .032⅔ × ⅝ = \$38.11, *Ans.*

7. Oct. 20 till March 10 = 4 mo. 20 da.;
\$316.84 × .023⅓ × ⅞ = \$8.63, *Ans.*

8. \$3146 × .136⅔ × ⅞ + \$3146 = \$3647.61, *Ans.*
\$96.85 × .189⅓ + \$96.85 = \$115.20, *Ans.*

9. \$96.85 × .139⅓ + \$96.85 = \$115.20, *Ans.*

10. \$1008.80 × .052⅔ × 1½ + \$1008.80 = \$1066.36, *Ans.*

11. \$2000 × .0025 × 2⅝ = \$2000 = \$2010.42, *Ans.*

12. \$137.60 × .021⅛ × ⅝ + \$137.60 = \$142.45, *Ans.*
From June 1, 1874, till Apr. 1, 1876 = 1 yr. 10 mo.

13. \$1671.64 × .11 × ⅞ + \$1671.64 = \$1886.17, *Ans.*

14. From Feb. 1, 1872, till Sept. 25, 1875 = 3 yr. 7 mo. 24 da.; *\$600 × .219* = \$131.40, *Ans.*

15. Receiving 10% and paying 6% he gains 4%
$9700 \times .04 = \$388$, *Ans.*

16. From Dec. 12, 1873, till July 3, 1875 = 1 yr. 6 mo. 21 da.; $\$127.36 \times .0935 \times \frac{3}{2} = \$8.93$, *Ans.*

17. From June 5, 1874, till Feb. 14, 1875 = 8 mo. 9 da.;
$\$250 \times .0415 \times \frac{4}{5} + \$250 = \$263.83$, *Ans.*

18. Time, less 3 mo. = 2 yr. 4 mo. 11 da.;
$\$710.50 \times .14\frac{1}{2} \times \frac{7}{6} + \$710.50 = \$828.07$, *Ans.*

19. He lost each year $12\frac{1}{2}\% - 7\frac{1}{2}\% = 5\%$;
$\$16840 \times .05 \times 2.3 \times \$1936.60$, *Ans.*

20. Time = 4 yr. 6 mo. 20 da.;
$\$2876.75 \times .27\frac{3}{5} \times \frac{4}{5} + \$2876.75 = \$3925.16$, *Ans.*

21. $\$9675 \div \$6.25 = 1548 =$ No. of bbl. purchased;
$\$7.375 \times 1548 = \$11416.50$, cash rec'd for flour;
$\$9675 \times .06\frac{4}{6} + \$9675 = \$10295.81$, cost of flour with interest till sold, 1 yr. 25 da.;
$\$11416.50 - \$10295.81 = \$1120.69$, *Ans.*

22. $\$10000 \times .02\frac{4}{3} = \$243.33$. a'mt paid in Boston;
$\$10000 \times .08 \div 365 \times 146 = \$320$; $\$320 - \$243.33 = \$76.67$, *Ans.*

23. $\$36 \times 450 = \$16200$, cost of land;
$\$16200 \times .224 \times \frac{11}{12} + \$16200 = \$19526.40$, cost with interest;
$\$40 \times \frac{3}{5}$ of $450 = \$7200$; $\$38.50 \times \frac{3}{5}$ of $450 = \$10395$;
$\$7200 + \$10395 = \$17595$, total receipts;
$\$19526.40 - \$17595 = \$1931.40$, loss, *Ans.*

Art. 577.

2. $49.50 ÷ .075 = $660 ; $49.50 ÷ .0625 = $792, *Ans.*

3. $153.75 ÷ .022½ = $6936.09 ;
$153.75 ÷ .025⅓ = $6069.08, *Ans.*

4. $213 ÷ .412⅝ = $516.71, *Ans.*

5. $173.97 ÷ .26 = $669.12; $173.97 ÷ 52 = $334.56, *Ans.*

6. $350 ÷ .035 = $10000, *Ans.*

Art. 579.

2. $1028 ÷ 1.028 = $1000, *Ans.*

3. $1596 ÷ 1.1375 = $1403.08, *Ans.*

4. $1531.50 ÷ 1.021 = $1500, *Ans.*

5. $918.73 ÷ 1.033⅓ = $889.25, *Ans.*

6. $761.44 ÷ 1.17 = $650.80, *Ans.*

Art. 581.

2. $68.11 ÷ ($2085 × .01 × $\frac{1}{15}$) = 7%, *Ans.*

3. $252 ÷ ($1500 × .01 × 2.4) = 7%, *Ans.*

4. $1189 ÷ ($14500 × .01 × 1) = 8$\frac{1}{2}$%, *Ans.*

5. $1684.50 − $1500 ÷ ($1500 × .01 = 2.05) = 6%, *Ans.*

6. $120 ÷ ($2000 × .01 × 3) = 2% a month, *Ans.*

7. $1620 ÷ ($15600 × .01 × 1) = 10$\frac{5}{13}$%, *Ans.*

8. $1 ÷ ($1 × .01 × 4) = 25%, *Ans.*

9. $2 ÷ ($1 × .01 × 2) = 100%, *Ans.*

10. *$297 × 12 ÷ ($49500 × .01 × 1)* = 7$\frac{1}{5}$%, Ans.

11. \$168 int. shows 4% gain in 6 mo.;
\$168 + \$168 × 1.04 = \$342.72, annual yield from the first investment;
\$342.72 ÷ (\$4200 × .01 × 1) = 8.18 +; $8\frac{2}{50}\%$ = 1st rate;
\$712.50 ÷ (\$7500 × .01 × 1) = $9\frac{1}{2}$; $9\frac{1}{2}\%$ = 2d rate;
Difference in favor of latter investment = $1\frac{11}{50}\%$, *Ans.*

Art. 583.

2. \$6.43 ÷ \$175.12 × .06 = .612; .612 yr. = 7 mo. 10 da.

3. \$1500 − \$1000 ÷ \$1000 × .075 = $6\frac{2}{3}$;
$6\frac{2}{3}$ yr. = 6 yr. 8 mo., *Ans.*

4. \$1260 ÷ \$8750 × .02 = 7.14; 7.14 mo. = 7 mo. 6 da.

5. \$1522.88 − \$1301.64 ÷ \$1301.64 × .05 = 3.4;
3 yr. 4 mo. 24 da., *Ans.*

6. See note, Art. 581; \$1 ÷ \$1 × .03 × 1 = $33\frac{1}{3}$;
33 yr. 4 mo., *Ans.*

7. \$2 ÷ \$1 × .04 × 1 = 50; 50 yr., *Ans.*

8. \$120 ÷ \$120 × .08 × 1 = 12.5; 12. yr. 6 mo., *Ans.*
\$60 ÷ \$120 × .08 × 1 = 6.25; 6 yr. 3 mo., *Ans.*
\$240 ÷ \$120 × .08 × 1 = 25; 25 yr., *Ans.*

Art. 586.

2. \$350 × 1.07 × 1.07 × 1.07 = \$428.77, *Ans.*

3. \$1200 × 1.05 × 1.05 × 1.05 − \$1200 = \$189.15, *Ans.*

4. \$864.50 × 1.08 × 1.08 × 1.08 × 1.08 = \$1176.14, *Ans.*

5. \$680 × 1.035 × 1.035 × 1.035 × 1.035 − \$680 = \$100.32, *Ans.*

6. $460 × 1.015 × 1.015 × 1.015 × 1.015 × 1.015 × 1.013 − $460 = $41.99, *Ans.*

7. $1250 × 1.025 *seven times* × 1.006⅔ = $1495.77, *Ans.*

8. $790 × 1.02 × 1.02 × 1.02 × 1.006 − $790 = $53.38.

10. $749.25 × 1.989789 = $1490.85, am't for 10 yr.;
$1490.85 × .02 × ⅞ + $1490.85 = $1525.64, am't for 10 yr. 4 mo., *Ans.*

11. $1500 × 1.272279 = $1908.42, am't for 3 yr. 6 mo.;
$1908.42 × .023 × ⅞ + $1908.42 = $1959.63, a'mt for 3 yr. 10 mo. 18 da.;
$1959.63 ÷ 1.271⅛ = $1540.79, *Ans.*

12. $850 × 1.02 *seven times* × 1.011⅓ = $987.23, *Ans.*

13. $500 × 3.869684 = $1934.84, *Ans.*

14. Time = 6 yr. 3 mo. 18 da.;
$12500 × 1.425761 × 1.018 = $18142.81, *Ans.*

Art. 589.

2. $1500 × .07 × 4 = $420
$105 × .07 × 6 = 44.10 $464.10, *Ans.*

3. $3500 × .08 × 10 = $2800;
280 × .08 × 45 = $1008, Int. on 1 year's int. for 45 yr.;
$3500 + $2800 + $1008 = $7308, *Ans.*

4. ($2500 × .06 × 6) + ($150 × .06 × 15) + $2500 = = $3535, Annual int. 6 yr.;
$2500 × 1.418519 = $3546.30, Comp. int. for 6 yr.;
$3545.30 − $3535 = $11.30, *Ans.*

5. ($575 × .08 × 9.5) + ($46 × .08 × 40.5) + $575 = = $1161.04, *Ans.*

6. ($800 × .07 × 4) + ($56 × .07 × 6) + $800 = $1047.52.

Art. 597.

3. Principal	$1500	
Int. due June 5, 1872, 2 mo. 4 da. @ 5%	13.33	
	1513.33	
Payment	300	
2d Principal	1213.33	
Int. due Oct. 15, 1872, 4 mo. 10 da.	21.91	
	1235.24	
Payment	37.75	
3d Principal	1197.49	
Int. due May 1, 1873, 6 mo. 16 da. .	32.60	
	1230.09	
Payment	97.25	
4th Principal	1132.84	
Int. due Aug. 6, 1873, 3 mo. 5 da. .	14.95	
	1147.79	
Payment	495.00	
	652.79	
Int. due Oct. 25, 1873, 2 mo. 19 da.	7.16	
Am't due Oct. 25, 1873 . .	$659.95,	*Ans.*

4. Principal	$700.00	
Int. due Dec. 5, 1873, 1 mo. 4 da. .	4.63	
	704.63	
Payment	75.00	
2d Principal	629.63	
Int. due Jan. 10, 1874, 1 mo. 5 da. .	4.29	
	633.92	

	633.92
Payment	350.00
3d Principal	283.92
Int. due Apr. 11, 1874, 3 mo. 1 da. .	5.02
	288.94
Payment	11.25
4th Principal	277.69
Int. due May 15, 1874, 1 mo. 4 da. .	1.84
	279.53
Payment	250.00
5th Principal	29.53
Int. due Sept. 1, 1874, 3 mo. 16 da.	.61
Am't due Sept. 1, 1874 . .	$30.14, *Ans.*

5. Principal	$497.39
Int. due Nov. 3, 1874, 7 mo. 18 da.	18.90
	516.29
Payment	57.50
2d Principal	458.79
Int. due June 15, 1875, 7 mo. 12 da.	16.98
	475.77
Payment	22.25
3d Principal	453.52
Int. due Aug. 1, 1875, 1 mo. 16 da.	3.48
	457.00
Payment	125.00
4th Principal	332.00
Int. due Sept. 15, 1875, 1 mo. 14 da.	2.43
	334.43

	334.43
Payment	175.00
5th Principal	159.43
Int. due Jan. 1, 1876, 3 mo. 16 da. .	2.82
Am't due Jan. 1, 1876 . . .	$162.25, *Ans.*

Art. 598.

2.	Am't of	$950.00	from	Jan. 25	till	Oct. 25,	274 da.,	$999.78
	"	$225.00	"	Mar. 2	"	"	237 da.,	$235.20
	"	$174.19	"	May 5	"	"	173 da.,	179.95
	"	$187.50	"	June 29	"	"	118 da.,	191.73
	"	$79.15	"	Aug. 1	"	"	85 da.,	80.43 687.31
				Balance due Oct. 25, 1876,				*Ans.* $312.47
3.	Am't of	$1750	from	April 5	till	Dec. 31,	270 da.,	$1827.67
	"	$190	"	May 10	"	"	235 da.,	$197.34
	"	$230	"	July 1	"	"	183 da.,	236.92
	"	$645	"	Aug. 5	"	"	148 da.,	660.69
	"	$372	"	Oct. 1	"	"	91 da.,	377.56 1472.51
				Balance due Dec. 31, 1875,				*Ans.* $355.16

Art. 603.

2. $287.75 ÷ 1.021 = $281.83, *Ans.*

3. $2202.90 − $\overline{\$2202.90 \div 1.049}$ = $102.90, *Ans.*

4. $5500 + ($16500 ÷ 1.09) − $19500 = $1137.61, *Ans.*

5. $4200 − $\overline{\$4200 \times .03}$ = $4074, cash price;
($4200 ÷ 1.02) − $4074 = $43.65.

6. $\frac{\$1500 \times .07}{3} + \frac{\$1000 \times .07}{4}$ = $2552.50, the value of amount paid at the end of 6 mo.

$3500 − $2552.50 = $947.50, the bal. to be paid at the end of 6 mo.

$947.50 ÷ 1.0175 = $931.203, *Ans.* = present worth of bal. at the time of 2d payment.

7. Pres. worth of $356.25, due in 2 mo. 16 da. = $351.79
" " $497.50 " 4 mo. 16 da. = $486.47
Total due Sept. 15, 1875, *Ans.* $838.26

8. $300 × .66⅔ = $200, cost;
$300 ÷ 1.03 = $291.26, Present worth of sale;
$291.26 − $200 ÷ $200 = .456 + = 45$\frac{63}{100}$%, gain, *Ans.*

9. $.1175 × 470 × 230 ÷ 1.0525 = $12068.17, Pres. worth of debt;
$13000 − $12068.17 = $931.83, gain, *Ans.*

10. $8.75 ÷ 1.035 = $8.45 +; $8.60 ÷ 1.01$\frac{1}{8}$ = $8.50 +;
$.05 per bbl. in favor of the former, *Ans.*

11. $3750 × .15 = $562.50 Cash payment.
$3750 × .25 ÷ 1.015 = $923.65 Pres. w'th of 2d pay't.
$3750 × .20 ÷ 1.02 = $735.29 " 3d "
$3750 × .40 × 1.03 = $1456.31 " 4th "
Ans. $3677.75 Cash value of debt.

Art. 615.

2. $597.50 × .0105 = $6.27, Bank discount.
$597.50 − $6.27 = $591.23, Proceeds, *Ans.*

3. Am't of $1615 for 93 da. = $1643.80;
$1643.80 − ($1643.80 × .07 ÷ 365 × 93) = $1614.48, *Ans.*

4. $62.50 × 173.59375 = $10849.61, price of farm;
Cash, $2000;
$8849.61 × 1.03325 = $9143.86, am't of note at maturity;
$9143.86 × .03325 = $304,03, bank discount;
$9143.86 − $304.03 = $8839.83, proceeds of note;
$2000 + $8839.83 = $10839.83, Ans.

5. Date of maturity = July 27, 1875 + 3 mo. 3 da. = Oct. 30, 1875;

Term of discount = from Aug. 10 till Oct. 30 = 2 mo. 20 da. = 81 da.

$\$957.37 - (\$957.37 \times .08 \div 365 \times 81) = \$940.37$, proc'ds.

6. Term of discount 1 mo. 16 da. = 46 da.

$\$916.25 + (\$916.25 \times .014) = \$929.08$, amt. for 2 mo. 3 da.

$$\$929.08 - \left(\frac{\$929.08 \times .10}{365}\right) \times 46 = \$917.37, \text{ Proceeds, } Ans.$$

7. Date of maturity, May 1 + 93 da. = Aug. 2, 1875;

Term of discount, May 15 till Aug. 2 = 79 days;

$\$1315.75 - (1315.75 \times .07 \div 365 \times 79) = \$1295.82$, Proceeds, *Ans.*

8. Date of maturity, June 12 + 6 mo. 3 da. = Dec. 15, 1876; Term of discount, 30 da.

$\$1250 + (\$1250 \times .031) = \$1288.75$, amount for 6 mo. 3 da., or 186 da.

$$\$1288.75 - \left(\frac{\$1288.75 \times .06}{365}\right) \times 33 = \$1281.77, \text{ Proceeds, } Ans.$$

Art. 617.

2. $\$1425 \div \overline{1 - .00641\frac{2}{3}} = \$1434.20$, ***Ans.***

3. $\$675 \div \overline{1 - .062} = \$719.61$, ***Ans.***

4. $\$1915.75 \div \overline{1 - .0180\frac{5}{6}} = \$1951.03$, ***Ans.***

5. $\$2250 \div \overline{1 - .0180\frac{5}{6}} = \$2291.44$, ***Ans.***

6. $\$315.23 \div \overline{1 - .019375} = \$321.46$, ***Ans.***

7. $\$650 \div \overline{1 - .014\frac{3}{3}\frac{1}{6}} = \$659.88$, ***Ans.***

8. $\$2.625 \times 137\frac{1}{4} \div \overline{1 - .0180\frac{5}{6}} = \$368.25$, Ans.

Art. 619.

2.

Date.	Balance.	Bal. on Int.	Int. 1 mo.
Feb. 1	$175		
March 1 . . .	175	$175	$.875
April 1 . . .	100	100	.50
May 1	160	100	.50
June 1 . . .	235	125	.625
July 1	185	185	.93
			$3.43

Due July 1, $185 + $3.43 = $188.43, *Ans.*

3.

Date.	Balance.	Bal. on Int.	Int. 1 mo.
Jan. 1	$350		
Feb. 1	200	$200	$1.00
March 1 . . .	150	150	.75
April 1 . . .	175	150	.75
May 1	175	175	.875
June 1 . . .	205	175	.875
July 1	230	130	.65
		Int. to be added July 1,	$4.90, *Ans.*

4.

Date.	Balance.	Bal. on Int.	Int. for Quarter.
July 1, 1874	$275		
Aug. 1 . . .	300		
Sept. 1 . . .	150		
Oct. 1 . . .	207	$150	$2.25
Nov. 1 . . .	557		
Dec. 1 . . .	489		
Jan. 1, 1875	364	207	3.11
		Int. due	$5.36

Due Jan. 1, 1875, $364 + $5.36 = $369.36, *Ans.*

5.

Date.	Balance.	Bal. on Int.	Int.
Jan. 1, 1874 . . .	$136.00		
April 1	161.00	$136.00	$2.04
July 1	161.00	161.00	2.41
" Int. added	165.45		
Oct. 1	177.95	165.45	2.48
Jan. 1, 1875 . . .	177.95	177.95	2.67
" Int. added	183.10		
April 1	95.60	95.60	1.43
July 1	245.60	95.60	1.43
" Int. added	248.46		
Oct. 1	248.46	248.46	3.73
Jan. 1, 1876 . . .	320.36	248.46	3.73
" Int. added	$327.92 = am't due, *Ans.*		

Art. 648.

2. $\$100 \times \overline{.97\frac{3}{4} + .00\frac{1}{8}} \times 350 = \$34256.25$, *Ans.*

3. $\$1000 \times \overline{1.12\frac{1}{2} + .00\frac{1}{8}} \times 15 = \$16856.25$, *Ans.*

4. $\$100 \times \overline{1.27 - .00\frac{1}{4}} \times 125 = \$15843.75$, *Ans.*

Art. 649.

2. $\$27000 \div (\$100 \times \overline{1.07\frac{3}{4} + .00\frac{1}{4}}) = 250$, No. shares, *Ans.*

3. $\$21560 \div (\$100 \times \overline{.97\frac{3}{4} + .00\frac{1}{4}}) = 220$, No. shares, *Ans.*

5. $\$990 \div (\$100 \times \overline{1.02\frac{1}{2} - .97\frac{1}{2} - .00\frac{1}{4}}) = 220$, No. shares.

6. $\$1680 \div (\$100 \times \overline{1.04 - 1.01 + .00\frac{1}{2}}) = 480$, No. shares.

7. $\$1200 \div (\$100 \times \overline{1.16\frac{3}{4} - 1.10\frac{1}{2} - .00\frac{1}{4}}) = 200$, No. shares, *Ans.*

8. \$1 will buy \$$\frac{100}{106}$ of N. Y. 6's, yielding at 6%, \$.05$\frac{8}{9}$;
\$2 will buy \$$\frac{200}{99}$ of U. S. 5's, yielding at 5%, \$.10$\frac{10}{99}$;
\$.05$\frac{8}{9}$ + \$.10$\frac{10}{99}$ = \$.15$\frac{82}{99}$, income from \$3 invested;
\$3348 ÷ \$.15$\frac{82}{99}$ = 21384; \$3 × 21384 = 64152;
$\frac{1}{3}$ of \$64152 = \$21384, invested in N. Y. 6's;
$\frac{2}{3}$ of \$64152 = \$42768, invested in U. S. 5's.

9. \$12480 ÷ 1.04 × .06 = \$720, income in gold;
\$1.10 × 720 = \$792, *Ans.*

Art. 664.

2. \$5700 × .0075 = \$42.75, *Ans.*

3. \$2750 × .00$\frac{1}{8}$ = \$24.06, *Ans.*

4. \$15000 × .01$\frac{1}{4}$ = \$187.50, *Ans.*

5. $\overline{\text{\$25000} \times .01\frac{3}{4}} - \frac{1}{2}$ of $\overline{\text{\$25000} \times .02\frac{1}{4}}$ = \$156.25, *Ans.*

Art. 665.

2. \$280 ÷ \$16000 = .0175; 1$\frac{3}{4}$%, *Ans.*

3. \$4.30 ÷ \$860 = .005; $\frac{1}{2}$%, *Ans.*

4. $\overline{\text{\$20000} \times .00\frac{3}{4}} + \overline{\text{\$30000} \times .00\frac{1}{2}}$ = \$300;
\$300 ÷ \$50000 = .006; $\frac{3}{5}$%, *Ans.*

Art. 666.

2. \$93.50 ÷ .01$\frac{3}{8}$ × 2 = \$13600, *Ans.*

3. \$245 ÷ .04$\frac{3}{8}$ ÷ $\frac{5}{8}$ = \$8960, *Ans.*

5. \$22163 ÷ .9974 = \$22220.77, *Ans.*

6. \$35000 ÷ (1 — $\overline{.90 \text{ of } \frac{1}{4}\%}$) = \$35078.93
\$9500 ÷ (1 — .0056$\frac{1}{4}$) = \$9553.74
\$4500 ÷ (1 — .003$\frac{3}{8}$) = \$4515.24 \$49147.91, *Ans.*

7. $\$73.50 \div .004 \div \frac{1}{4} = \$24500$, *Ans.*

8. $\$25200 \times (1 - .0175) = \$24759$, *Ans.*

9. $\$107.25 \div .0325 \div .80 \times 1.20 \div 500 = \$9.90$, *Ans.*

Art. 675.

2. $\$37.97 \times 7.5 = \$284.78$, *Ans.*

3. $\$105.53 \times 10 = \$1055.30$, *Ans.*

5. $\$105.53 \times 5 = \$527.65$, *Ans.*

6. $\$105.53 \times 5 \times 9 + (\$527.65 \times .06 \times 36) = \$5888.57$.

If he dies immediately after the 9th payment, he will lose 8 yr. int. on the first payment, 7 yr. on the second, etc., 36 yr. in all.

7. $\$26.38 \times 5 \times 9 + (\$26.38 \times 5 \times .06 \times 36) = \$1472$.

$\$5888.57 - \$1472 = \$4416.57$, *Ans.*

8. $\$501.69 \times 7.5 = \$3762.68$;

Int. for 3 yr. 5 mo. $= \$771.35$;

$\$3762.68 + \$771.35 = \$4534.03$, cost by first plan;

$\$37.97 \times 7.5 \times 4 = \$1139.10$, cash pay'ts by 2d plan;

$\$284.78 \times .06 \times 7\frac{2}{3} = \$131$, annual int. on payments;

3 yr. 5 mo. + 2 yr. 5 mo. + 1 yr. 5 mo. + 5 mo. = 7 yr. 8 mo. $= 7\frac{2}{3}$ yr.

$\$1139.10 + \$131 = \$1270.10$, cost at death by second plan;

$\$4534.03 - \$1270.10 = \$3263.93$, *Ans.*

9. $\$104.16 \times .85 \times 5 \times 10 = \$4426.80$, cash prem. paid.

Int. on \$442.68 at 7% for 55 yr. $= \$1704.32$;

$\$4426.80 + \$1704.32 - \$5000 = \$1131.12$, loss. *Ans.*

10. First pay't with comp. int. for 3 yr. 6 mo. = $1376.81
Second " " 2 yr. 6 mo. = 1286.74
Third " " 1 yr. 6 mo. = 1202.56
Fourth " interest 6 mo. = 1123.89
Total payments with comp. int. added = $4990.00
$12190 — $4990 = $7200, *Ans.*

Art. 685.

2. $11123 ÷ .98 = $11350, *Ans.*

3. $18500 ÷ .97 = $19072.16, *Ans.*

4. $1260.52 ÷ .965 = $1306.24;
$1306.24 ÷ .00325 = $401920, *Ans.*

7. $17.40 + $4.35 + $.783 + $.052 + $\overline{\$.50 \times 5}$ = $25.09.

8. $78.30 + $6.09 + $.696 + $.044 + $\overline{\$.75 \times 3}$ = $87.38.

9. $104.40 + $2.61 + $.435 + $.052 + $\overline{\$1.25 \times 4}$ = $112.50, *Ans.*

10. $217.50 + $3.48 + $.696 + $.078 + $\overline{\$.95 \times 5}$ = $226.50.

Prop.	Tax.	Prop.	Tax.	Prop.	Tax.	Prop.	Tax.
$1	$.0228	$9	$.2052	$80	$1.824	$700	$15.96
2	.0456	10	.228	90	2.052	800	18.24
3	.0684	20	.456	100	2.28	900	20.52
4	.0912	30	.684	200	4.56	1000	22.80
5	.1140	40	.912	300	6.84	2000	45.60
6	.1368	50	1.14	400	9.12	3000	68.40
7	.1596	60	1.368	500	11.40	4000	91.20
8	.1824	70	1.596	600	13.68	5000	114.00

This table is true only to the 4th decimal place.

11. \$11386 × 1.03¼ = \$11769.05, total tax raised;
\$11769.05 − \$1.25 × 760 = \$10816.41, property tax;
\$10819.95 ÷ \$474000 = 0228+, rate of taxation.
\$6750 + \$2500 = \$9250. By the table the
Tax = \$205.20 + \$4.56 + \$1.14 + \$1.25 × 3 = \$214.65.

12. Tax on \$17750 = \$387.60 + \$15.96 + \$1.14 + \$1.25 × 5 = \$410.95, *Ans.*

13. \$205.20 + \$15.96 + \$1.824 + \$.137 + \$1.25 = \$224.37.

14. \$7500 × (.0175 + .00125 + .005) = \$178.13, *Ans.*

15. \$916.65 × 1.03 ÷ .00225 = \$419622, *Ans.*

Art. 700.

2. \$.985 × 1590 = \$1566.15, *Ans.*

4. \$1.015 − \$.0055 (bank discount 33 da.) × 4720 = \$4764.84, *Ans.*

5. \$.995 − \$.0180 (bank disc't) × 5275 = \$5153.24.

6. \$1.01375 − \$.0155 × 6400 = \$6388.80, *Ans.*

7. \$1.02125 − .0155 × 5600 = \$5632.20, *Ans.*

Art. 701.

2. \$797.50 ÷ 1.025 − .01225 = \$787.46, *Ans.*

3. \$711.90 ÷ .98⅛ = \$720, *Ans.*

4. \$.115 × 2780 × .975 ÷ .985 = \$316.45, *Ans.*

5. \$2283.1875 ÷ 1.0125 ÷ .05 ÷ 100 = 451, *Ans.*

6. \$5151.09 ÷ \$5320 = .96825 cost of exchange.
Bk. disc't for 63 = .0105 of \$1.
.97875 course of exchange.

7. \$.125 × 520 × 250 × 1.25 × .985 ÷ .995 = \$20108.35.

Art. 706.

2. £473 5s. 9d. = £473.2875;
$4.8665 \times 473.2875 = \$2303.25$, *Ans.*

3. £625 4s. 3d. = £625.2125;
$4.835 \times 625.2125 = \$3022.90$, gold;
$1.0975 \times 3022.90 = \$3317.63$, in currency, *Ans.*

5. 697.5 fr. $\div$ 5.175 fr. = 134.78; \$134.78, *Ans.*

6. 1665 fr. $\div$ 5.15625 fr. = 320.97; \$320.97, gold;
$1.09\frac{1}{8} \times 320.97 = \$352.67$, currency, *Ans.*

8. $.9625 \div 4 \times 1750 = \$421.09$, *Ans.*

9. $.95375 \div 4 \times 2155 \times 1.1025 = \$566.50$, *Ans.*

11. $.41125 \times 1950 = \$801.94$, *Ans.*

12. $\overline{\$.4125 \times 3750} + \overline{\$.955 \div 4 \times 1000} + \overline{\$4.85 \times 500} \times 1.09\frac{3}{4} = \$4621.16$, *Ans.*

13. $.4175 \times 12560 = \$5243.80$, *Ans.*

14. $.9425 \div 4 \times 13550 \times 1.095 \times 1.00125 = \$3500.40$.

Art. 707.

2. \$7500 $\div$ \$4.86 = 1543.21; £1543.21 = £1543 4s. 2d.

4. (\$550 $\div$ \$.94875) $\times$ 4 = 2318.84; 2318.84 marks, *Ans.*

5. (\$395.75 $\div$ \$.95125) $\times$ 4 = 1664.13;
1664.13 marks, *Ans.*

7. 5.155 fr. $\times$ 6186 = 31888.83 fr., *Ans.*

8. 5.1675 fr. $\times$ 2500 = 12918.75 fr., *Ans.*

Art. 711.

2. *750 M.* $\div$ 4 $\times$ 4.91 $\times$ 920.625, No. of fr. in Paris;
920.625 fr. $\div$ *5.15* fr. = 178.76, No. dollars sent from *Boston*; $\$1.00\frac{1}{4} \times 178.76 = \$179.21$, cost in Boston.

5. x fr. = \$1
\$4.845 = £1
£1 = 25.73 fr.; x=5.31 fr.+, *Ans.*

6. \$$x$ = £1
£1 = 25.71 fr.
5.155 fr. = \$1; x=\$4.987, *Ans.*

7. £x = \$5000 1.22 fr. = 1 M.
\$1 = 5.18 fr. 1.70 M. = 1 guil.
11.83 guil. = £1; x=£1055 12s. 4d., *Ans.*
\$5000÷\$4.83½=1034.126; £1034 2s. 6.26d.;
£21 9s. 9.7d., gain.

8. \$$x$ = 35000 fr.
£1 = \$4.83
25.12 fr. = £1
1 = 1.005; x=\$6763.34, indirect exchange.
35000 fr.÷5.15 fr.=6796.12 = No. of dollars by direct exchange.
\$6796.12—\$6763.34 = \$32.78, in favor of indirect exchange, *Ans.*

9. x guilders = \$4500
\$4.875 = £1
£1 = 11.175 guilders
1 = .995
1.005 = 1; x=10212.743 guilders.
\$4500÷\$.4125=10909.0909+, No. of guilders by direct exchange.
10909.0909 guil.—10212.743 guil.=696.374 guil. *loss* by indirect exchange, Ans.

10. $\$75 \times 165 = \$12375$, cost in New Orleans.
$\$x$ Cin. $= \$12375$, N. O.
$\$1$ N. O. $= \$.99625$ N. Y.
$\$1$ N. Y. $= \$1.02$, Cin.
1 $= 1.00\frac{1}{8}$; $x = \$12617.08$, cost in Cincin.

Art. 726.

2. $\$.0175 \times 500 \times 50 = \$437.50$, *Ans.*

3. $\$7.50 \times 350 \times .25 = \$656.25$, Ad valorem duty.
$\$2.50 \times 12 \times \frac{100 \times 350}{1000} = \$1050$, specific duty.
$\$656.25 + \$1050 = \$1706.25$, *Ans.*

4. $\$6 \times 100 = \$600$, duty on champagne.
$\$.60 \times 30 \times 25 = \$450$, specific duty on sherry.
$\$13 \times 100 \times .25 = \$325$, ad. val. duty on the champ.
$\$2.50 \times 30 \times 25 \times .25 = \$468.75$, ad val. duty on the sherry.
$\$600 + \$450 + \$325 + \$468.75 = \$1843.75$, *Ans.*

5. $(\$125 \times 25 \times .35) + (\$37.50 \times 15 \times .25) = \$1234.38$.

6. 1440 pt. $\times .975 = 1404$ pt. $= 175.5$ gal.
$\$.36 \times 175.5 = \$63.18$, *Ans.*

7. $\$.055 \times 24 \times 1\frac{1}{4} \times 175 \times 20 = \$577\frac{1}{2}$, *Ans.*

8. $\$.50 \times 213.5 \times 10 = \$1067.50$ sp. duty.
19375 fr. $\times .35 \times .193 = 1308.78$ No. of dollars ad val. duty.
19375 fr. $\div 5.155$ fr. $= 3758.49$ value of inv. in dol.
$\$6134.77$, in gold.
$\$1.10 \times 6134.77 = \$6748.25$, currency.
Charges 67.50
$\$6815.75$, total cost in currency.

9. 7125 fr. × .25 = 1781.25 fr. duty.
7125 invoice.
13.5 charges.
7125 fr. × .025 = 178.125 com.
9097.875 fr.
$.193 × 9097.875 = $1755.89, *Ans.*

10. $.50 × 695 = $347.50
$4.8665 × 375.5 × .35 = 639.58
$987.08, *Ans.*

Art. 733.

2. $800 × 1 = $800
750 × 4 = 3000 x = $9800 ÷ $2550 = 3.84; 3.84 mo.
1000 × 6 = 6000 average term of credit = 3 mo.
$2550 × x = $9800 25 da., *Ans.*

3. $500 × 3 = $1500 x = 6.85 mo.; av. term of credit
750 × 6 = 4500 = 6 mo. 26 da.
1200 × 9 = 10800 Dec. 1, 1876 + 6 mo. 26 da. =
$2450 × x = $16800 June 27, 1877, *Ans.*

4. $350 × 2 = $700 x = 4.13 mo.; average term of
500 × 3 = 1500 credit = 4 mo. 4 da.
700 × 6 = 4200 Jan. 1, 1875 + 4 mo. 4 da. =
$1550 × x = $6400 May 5, 1875, *Ans.*

5. $1680
560 × 5 = $2800 x = 59⅔ mo.; 4 yr. 11 mo. 20 da.,
420 × 3 = 1260 or 5 yr. 20 da. after last
336 × 2 = 672 payment, *Ans.*
280 × 1 = 280
$84 × x = $5012 $84 is the amount yet due.

7. $2500

$250 \times 5 = \$1250$
$300 \times 3 = 900$
$500 \times 1 = 500$
$\$1450 \times x = \$2650$

$x = 1.82+$; bal. is due 1 mo 25 da. after Oct. 1, or Nov. 26, *Ans.*

8. $\$225 \times 35 = \$7875$
$350 \times 60 = 21000$
$750 \times 90 = 67500$
$\$1325 \times x = \$96375$

$x = 73$; average term of credit $= 73$ da.
Dec. 15 + 73 da. = Feb. 26, *Ans.*

9. $\$300 \times 0 = \$$——
$360 \times 3 = 1080$
$240 \times 4 = 960$
$300 \times 6 = 1800$
$\$1200 \times x = \$3840$

$x = 3.2$; time of payment = Dec. 1, 1874 + 3 mo. 6 da. = Mar. 7, 1875.

$\$1200 \div 1.018\frac{3}{4} = \$1178.01$, cash value of goods at purchase.

Art. 734.

2.

Due.	Amt.		No. days.		Products.
April 30 . . .	800	×	0	=	0
May 15 . . .	350	×	15	=	5250
Sept. 20 . . .	3800	×	143	=	543400
	4950	×	x	=	548650

$x = 111$; Apr. 30 + 111 da. = Aug. 19, 1875, *Ans.*

3.

Due.	Amt.		No. da.		Products.
May 15 . . .	375	×	42	=	15750
April 3 . . .	550	×	0	=	0
July 25 . . .	1100	×	113	=	124300
May 2	250	×	29	=	7250
	2275	×	x	=	147300

$x = 65$; Apr. 3 + 65 da. = June 7, 1876, Ans.

4.

Due.	Amt.		No. da.		Products.
May 1	650	×	0	=	0
June 10 . . .	380	×	40	=	15200
July 12 . . .	900	×	72	=	64800
" 18 . . .	350	×	78	=	27300
August 3 . .	600	×	94	=	56400
	2880	×	x	=	163700

$x=57$; May 1 + 57 da. = June 27, 1874, equated time.
Discounted April 5 for 2 mo. 22 da.
$\$2880 \div 1.05\frac{7}{15} = \$2730.72$;
$\$2880 - \$2730.72 = \$149.28$, *Ans.*

5.

Due.	Amt.		No. da.		Products.
April 9 . . .	835	×	0	=	0
" 17 . . .	320	×	8	=	2560
" 25 . . .	475	×	16	=	7600
May 5 . . .	600	×	26	=	15600
" 12	250	×	33	=	8250
	2480	×	x	=	34010

$x=14$; April 9 + 14 da. = Apr. 23, 1874, *Ans.*

6.

Due.	Amt.	Time on Int.	Int.	Amt.
Dec. 15, 1875	$275	7 mo. 25 da.	$12.57	$287.57
" 9, "	351.50	8 mo. 1 da.	16.47	367.97
Nov. 27, "	415.75	8 mo. 13 da.	20.45	436.20
Mar. 3, 1876	500	5 mo. 7 da.	15.26	515.26
" 15, "	710	4 mo. 25 da.	20.02	730.02
		Amt. due Aug. 10, 1876,		$2337.02

7.

Due.	Amt.		No. da.		Products.
April 1, 1875 . .	425	×	0	=	0
May 10, " . .	615	×	39	=	23985
" 28, " . .	1500	×	57	=	85500
June 10, " . .	750	×	70	=	52500
	3290	×	x	=	161985

$x=49$; Apr. 1, 1875 + 49 da. = May 20, 1875, *Ans.*

Art. 737.

2.

Due.	Amt.	Da.	Prod.	Paid.	Amt.	Da.	Prod.
Nov. 5, 1874,	720 ×	26 =	18720	Oct. 10, 1874,	500 ×	0 =	0
" 10, "	850 ×	31 =	26350	Feb. 16, 1875,	450 ×	129 =	58050
" 3, "	1200 ×	24 =	28800	Dec. 25, 1874,	900 ×	76 =	68400
June 20, 1875,	620 ×	253 =	156860	Jan. 3, 1875,	250 ×	85 =	21250
	3390		230730		2100		147700
	2100		147700				
	1290		)83030				

64; Oct. 10, 1874 + 64 da. = Dec. 13, 1874, *Ans.*

3.

Due.	Amt.	Da.	Prod.	Paid.	Amt.	Da.	Prod.
July 31,	950 ×	0 =	0	Aug. 1,	700 ×	1 =	700
Sept. 4,	300 ×	35 =	10500	Sept. 20,	1000 ×	51 =	51000
Nov. 7,	1900 ×	99 =	188100	Nov. 1,	1200 ×	93 =	111600
Dec. 19,	2600 ×	141 =	366600				
	5750		565200		2900		163300
	2900		163300				
	2850		)401900				
			141				

July 31 + 141 da. = Dec. 19, 1877, *Ans.*

4. Due.	Amt.	Da.	Prod.	Paid.	Amt.	Da.	Prod.
May 20,	570	× 95 =	54150	Feb. 4,	490	× 0 =	0
" 28,	300	× 103 =	30900	Mch. 1,	1000	× 15 =	15000
June 11,	720	× 117 =	84240	Apr. 2,	1800	× 47 =	84600
" 26,	835	× 132 =	110220				
July 10,	1150	× 146 =	167900				
" 28,	960	× 164 =	157440				
Aug. 15,	475	× 182 =	86450				
	5010		691300		3290		99600
	3290		99600				
	1720		)591700	Feb. 14, 1878 + 344 da. =			
			344	Jan. 24, 1879, *Ans.*			

Art. 738.

2. Due.	Amt.	Da.	Prod.	Paid.	Amt.	Da.	Prod.
May 1,	1500	× 0 =	0	July 1,	450	× 61 =	27450
Aug. 15,	750	× 106 =	79500	" 15,	370	× 75 =	27750
	2250		79500		820		55200
	820		55200				
	1430		)24300	May 1 + 17 da. = May 18.			
			17				

From May 18 till Dec. 10 = 6 mo. 22 da.

Amt. of $1430 for 6 mo. 22 da. @ 7% = $1486.17, *Ans.*

3. Due.	Amt.	Da.	Prod.	Paid.	Amt.	Da.	Prod.
Oct. 9, 1875,	751.35	× 6 =	4508.10	Oct. 3, 1875,	300	× 0 =	0
" 5, "	425	× 2 =	850	Feb. 13, 1876,	450	× 133 =	59850
Jan. 30, 1876,	927.83	× 119 =	110411.77	Dec. 20, 1875,	500	× 78 =	39000
" 4, "	1200	× 93 =	111600				
	3304.18		227369.87		1250		98850
	1250		98850				
	2054.18		)128519.87	Oct. 3, 1875 + 63 da. =			
			63	Dec. 5, 1875, Ans.			

4. From Dec. 5 till Jan. 1, are 27 da.

Amt. of $2054.18 for 27 da. @10%=$2069.59, *Ans.*

5. Due.	Amt.		Da.		Prod.	Paid.	Amt.		Da.		Prod.
May 4,	1600	×	63	=	100800	June 1,	500	×	91	=	45500
Apr. 6,	1500	×	35	=	52500	Mar. 2,	2000	×	0	=	0
June 9,	3000	×	99	=	297000	" 25,	3150	×	23	=	72450
May 28,	2500	×	87	=	217500	Apr. 16,	800	×	45	=	36000
	8600				667800		6450				153950
	6450				153950						
	2150				)513850						
					239						

March 2, + 239 da. = Oct. 27, equated time.

If paid July 1, it must be discounted for 3 mo. 26 da.

$2150 ÷ 1.022½ = $2102.58, *Ans.*

6. Due.	Amt.		Da.		Prod.	Paid.	Amt.	Da.	Prod.
Apr. 2,	87.25	×	0	=	0	Oct. 25,	600	× 206	= 123600
May 15,	35.75	×	43	=	1537.25	Sept. 3,	300	× 154	= 46200
						Oct. 1,	500	× 182	= 91000
	123.00				1537.25		1400		260800
							123		1537.25
							1277		)258262.75
									203.

Apr. 2 + 203 da. = Oct. 22, equated time.

A note for 60 da., dated Aug. 1, is due Sept. 30, 22 days before the equated time.

$1277 ÷ 1.003⅓ = $1272.33, face of the note drawn Aug. 1 for 60 da. without interest.

Art. 739.

2. Account sales of grain sold on account of J. Berry, of Chicago.

Date.	Quantity, etc.	Price.	Amount.
June 1,	350 bu. wheat	$1.35, 60 da.	$472.50
" 15,	275 " "	1.75, 90 "	481.25
July 3,	1260 " corn	.79, 6 mo.	995.40
" *10,*	*375* " Rye	1.02, 3 "	382.50
		Sales,	$2331.65

Charges.

May 28,	Freight	$567.50	
" 30,	Cartage	22.50	
June 5,	Insurance	56.25	
Oct. 26,	Com. and guaranty 5% .	116.58	$762.83
	Net proceeds,		$1568.82

Average of sales (Art. **734**) Oct. 26, hence the commission bears this date.

Equated time of paying balance (Art. **738**) is 62 da. from Oct. 26 or Dec. 27, *Ans.*

3. Account sales of sugar and tea sold on acct. of Brown, Sampson & Co.·

Oct. 1, 1874, 13 hhd., each 1520 lb. @ $.12½ on 6 mo. $2470

" 5, " 15 chests tea each 95 lb. @ 1.05 " 1496.25

Charges.

Oct. 3, 1874,	Insurance	$85	
" 10, "	Cooperage, etc., . .	24.50	
" 20, "	Cartage, ...	125	
Apr. 3, 1875,	Com. and guar. @ 4½%	178.48	412.98
	Net proceeds,		$3553.27

Average of sales (Art. **734**) Apr. 3, 1875, hence date of commission, etc.

Equated time of paying balance (Art. **738**) is 11 da. after Apr. 3, or Apr. 14, 1875, *Ans.*

Art. 767.

2. 4 horses : 20 horses :: 12 bu. : x; x=60 bu., *Ans.*

3. 96 c. : 40 c. :: \$240 : x; x=\$100, *Ans.*

4. 20 lb. : 45 lb. :: \$1.80 : x; x=\$4.05, *Ans.*

5. 18 bu. : 200 bu. :: 4 bbl. : x; x=44$\frac{4}{9}$ bbl., *Ans.*

Art. 770.

3. 5 horses : x :: 10 T. : 18 T.; x=9 horses, *Ans.*

4. 8 yd. : x :: \$6 : \$75 ; x=100 yd., *Ans.*

5. x : 5 men :: 32 rd. : 10 rd.; x=16 men, *Ans.*

6. 5 sh. : x :: \$20.75 : \$398.40 ; x=96 sheep, *Ans.*

7. 10 bbl. : 476 bbl. :: \$112.50 : x; x=\$5355, *Ans.*

8. 30 min. : 260 min. :: 50 min. : x; x=433$\frac{1}{3}$ min.= 7 hr. 13 min. 20 sec., *Ans.*

9. x : 8 bu. :: \$454.40 : \$10.24 ; x=355 bu., *Ans.*

10. 12 mi. : x :: 1.6 hr. : 15 hr.; x=112$\frac{1}{2}$ miles, *Ans.*

11. x : 7$\frac{1}{2}$ da. :: 95 men : 12 men ; x=59$\frac{3}{8}$ da., *Ans.*

12. $\frac{3}{8}$ A. : 45$\frac{3}{4}$ A. :: 60 : x; \$60 × 45$\frac{3}{4}$ ÷ $\frac{3}{8}$=\$7320, *Ans.*

13. 72 yd. : x :: £44.8 : £5.6 ; x=9 yd., *Ans.*

14. $\frac{7}{8}$ bbl. : $\frac{5}{6}$ bbl. :: \$1$\frac{9}{16}$: x; \$$\frac{25}{16}$ × $\frac{5}{6}$ ÷ $\frac{7}{8}$=\$1$\frac{41}{84}$, *Ans.*

15. 35$\frac{9}{16}$ A. : x :: \$284.50 : \$374.70 ; x=46 A. 134 P.

16. 1.75 yd. : 87.5 yd. :: \$1.26 : x; x=\$63, *Ans.*

17. \$456.25 : \$1000 :: \$5000 : x; x=\$10958.90, *Ans.*

18. 2240 lb. : 2000 lb. :: \$4.48 : x; x=\$4, cost; \$7.25—\$4=\$3.25, gain, *Ans.*

19. $18 \times 4 \times 6 : 80 \times 4 \times 4 :: \$30.24 : x$; $x \times \$89.60$, *Ans.*

20. \$53.50—\$44.50=\$9. gain on 36 bu.;
36 bu. : 480 bu. :: \$9 : x; x=\$120, *Ans.*

21. \$700 : \$1050 :: $1\frac{2}{3}$ yr. : x; $x=2\frac{1}{2}$ yr., *Ans.*

NOTE.—In solution of statements all terms are to be treated as abstract numbers.

Art. 772.

2. 20 H. : 12 H.
9 mo. : 18 mo. } :: 36 T. : x; $x=43\frac{1}{5}$ tons, *Ans.*

3. 4 persons : 15 persons
8 wk. : x } :: \$320 : \$800; $x=5\frac{1}{3}$ wk.

4. 6 da. : 18 da.
8 hr. : 6 hr. } :: 192 mi. : x; x=432 mi., *Ans.*

5. 6 lab. : 20 lab.
10 da. : x } :: 34 yd. : 170 yd.; x=15 da., *Ans.*

Art. 774.

2. 5 ft. : 8 ft.
75 ft. : 566 ft. } :: \$41.25 : x; x=\$498.08, *Ans.*

4. 4 hr. : 20 hr.
12 da. : 56 da. } :: 48 bu. : x; x=1120 bu., *Ans.*

5. \$800 : x
15 mo. : 8 mo. } :: \$70 : \$300; x=\$6428.57, *Ans.*

6. 800 cop. : 3000 cop.
230 pp. : 400 pp.
40 lin. : 35 lin. } :: 20 rm. : x; $x=114\frac{3}{23}$ rm.

7. 10 men : 40 men
18 da. : 24 da.
10 hr. : 9 hr.
} :: 46 Cd. : x; x=220½ Cd., *Ans.*

8. 2½ yd. : 36½ yd.
1⅞ yd. : 1½ yd.
} :: $3.375 : x; x=$52.79, *Ans.*

9. 45 men : x
3 mo. : 2½ mo.
} :: 1 (the work) : 1; x=54 men.
54 men − 45 men = 9 men, *Ans.*

10. 16 ft. : 17½ ft.
7 ft. : 10½ ft.
15 ft. : 13 ft.
} :: 384 bbl. : x; x=546 bbl., *Ans.*

11. 10 ft. : 8 ft.
5 ft. : 4 ft.
16 in. : 10 in.
} :: 5200 lb. : x; x=2080 lb., *Ans.*

12. 20 T. : 400 T.
1½ mi. : ½ mi.
} :: $15 : x; x=$100, *Ans.*

13. 200 ft. : 600 ft.
20 ft. : 24 ft.
16 in. : 240 in.
} :: { 13500 br. : x
8 in. : 10 in.
4 in. : 5 in.
2 in. : 3½ in.
x=266605¼ bricks, *Ans.*

14. 28.5 gal. : 63 gal. × 15 :: $7.125 : x; x=$236.25.

15. 6.25d. : 2480d. :: 1.75 yd. : x; x=694.4 yd., *Ans.*

16. $750 : x
4.5 yr. : 1.5 yr.
} :: $202.50 : $155.52; x=$1728.

17. 15 men : 60 men
20 da. : x
} :: 1 : 1; x=5 da., *Ans.*
Or, 60 men : 15 men :: 20 da. : x.

18. 1.75 lb. : 70 lb. :: $\left\{\begin{matrix} 2\frac{1}{2} \text{ yd.} : x \\ 6 \text{ qr.} : 4 \text{ qr.} \end{matrix}\right.$; x=150 yd., *Ans.*

19. $\left.\begin{matrix} \$300 : \$210 \\ 1\frac{2}{3} \text{ yr.} : x \end{matrix}\right\}$ :: \$30 : \$42.891 ; x=3.4 yr. *Ans.*

20. \$18 : \$21 :: \$10 : x ; x=\$11$\frac{2}{3}$, *Ans.*

21. $\left.\begin{matrix} 6 \text{ men} : x \\ 3 \text{ da.} : 12 \text{ da.} \\ 10.25 \text{ hr.} : 8.2 \text{ hr.} \end{matrix}\right\}$ :: $\left\{\begin{matrix} 22.5 \text{ ft.} : 45 \text{ ft.} \\ 17.3 \text{ ft.} : 34.6 \text{ ft.} \\ 10.25 \text{ ft.} : 12.3 \text{ ft.}; \end{matrix}\right.$

x = 9 men, *Ans.*

22. $\left.\begin{matrix} 8 \text{ ft.} : 18 \text{ ft.} \\ 4\frac{1}{2} \text{ ft.} : 3\frac{3}{8} \text{ ft.} \\ 2\frac{1}{2} \text{ ft.} : x \end{matrix}\right\}$ :: 67.5 bu. : 450 bu. ; x=8.116 ft.

23. $\left.\begin{matrix} 10 \text{ lb.} : 16 \text{ lb.} \\ 5 \text{ lb.} : 120 \text{ lb.} \end{matrix}\right\}$ :: \$1.25 : x ; x=\$48, *Ans.*

24. \$48.75 : \$43.125 :: \$60 : x ; x=\$53.08, *Ans.*

25. $\left.\begin{matrix} 6 \text{ men} : 10 \text{ men} \\ 4 \text{ mo.} : x \\ 26 \text{ da.} : 24 \text{ da.} \\ 12 \text{ hr.} : 10 \text{ hr.} \end{matrix}\right\}$ :: $\left\{\begin{matrix} 24 \text{ bk.} : 10 \text{ bk.} \\ 300 \text{ pp.} : 240 \text{ pp.} \\ 60 \text{ li.} : 52 \text{ li.} \\ 12 \text{ wd.} : 16 \text{ wd.} \\ 6 \text{ let.} : 8 \text{ let.} \end{matrix}\right.$

x=1.6 mo.=1 mo. 14.4+ da., *Ans.*

NOTE.—A month equals 24 days.

Art. 782.

3. \$4000+\$2700+\$2300=\$9000.

$\left.\begin{matrix} \text{A's share of rent} = \frac{4}{9} \text{ of } \$720 = \$320 \\ \text{B's} \quad " \quad " = \frac{3}{10} \quad " = 216 \\ \text{C's} \quad " \quad " = \frac{23}{90} \quad " = 184 \end{matrix}\right\}$ *Ans.*

4. \$7.50 × 230.4 = \$1728 whole rent.
Whole number of sheep 1640.

A will pay $\frac{288}{1640}$ of \$1728 = \$303.45
B " $\frac{320}{1640}$ " = \$337.17
C " $\frac{384}{1640}$ " = \$404.61
D " $\frac{648}{1640}$ " = \$682.77 } *Ans.*

5. \$22000 − \$8800 = \$13200, net liabilities.

A will receive \$4275 − ($\frac{4275}{22000}$ of \$13200) = \$1710, *Ans.*
B " \$2175.50 − ($\frac{21755}{220000}$ of \$13200) = \$870.20.

6. The entire gain is \$7500, which is $33\frac{1}{3}\%$ of the entire capital.

\$2000 ÷ .$33\frac{1}{3}$ = \$6000 , A's capital.
2800.75 ÷ .$33\frac{1}{3}$ = \$8402.25, B's "
1685.25 ÷ .$33\frac{1}{3}$ = \$5055.75, C's "
1014 ÷ .$33\frac{1}{3}$ = \$3042 , D's " } *Ans.*

7. One will receive \$9 as often as the other receives \$8

$\frac{9}{17}$ of \$10927.60 = \$5785.20
$\frac{8}{17}$ " = \$5142.40 } *Ans.*

8. Of every \$30, C puts in \$14, or $\frac{14}{30}$ of capital.
$\frac{7}{15}$ of \$37680 = \$17584, C's cap., also entire gain

$\frac{6}{30}$ of \$17584 = \$3516.80 , A's gain.
$\frac{10}{30}$ " = \$5861.$33\frac{1}{3}$, B's "
$\frac{14}{30}$ " = \$8205.$86\frac{2}{3}$, C's " } *Ans.*

9.

Resources.		Liabilities.	
$24843.75	Bills Rec.	$14058.75	Bills Pay.
$42375.80	Cash.	$12375.80	Account.
$26500.00	Account.		
$175840.00	Mdse.		
$269559.55		$26434.55	
26434.55			
$243125.00	Net capital.		
125000.00	Investment.		
$118125.00	Net gain.		

$\frac{60}{125}$ of \$118125 = \$56700 Ames' share of gain.
$\frac{50}{125}$ " = \$37800 Lyon's " "
$\frac{25}{125}$ " = \$23625 Clark's " " } *Ans.*

Art. 783.

2.
\$12000 × 6 = \$72000
10000 × 8 = 80000
8000 × 11 = 88000
\$240000

$\frac{72}{240}$ of \$8000 = \$2400 Barr's gain.
$\frac{80}{240}$ " = \$2666$\frac{2}{3}$ Banks' "
$\frac{88}{240}$ " = \$2933$\frac{1}{3}$ Butts' " } *Ans.*

3.
\$1300 × 12 = \$15600
1000 × 10 = 10000
900 × 5 = 4500
\$30100

$\frac{156}{301}$ of \$750 = \$388.70 A's gain.
$\frac{100}{301}$ " = \$249.17 B's "
$\frac{45}{301}$ " = \$112.13 C's " } *Ans.*

4. $\$2000 \times 10 = \$20000$
$1600 \times 4 = 6400$
$2000 \times 10 = 20000 \quad \$46400$

$\$3000 \times 4 = \$12000$
$3500 \times 12 = 42000$
$2000 \times 8 = 16000 \quad \$70000$

$\$116400$

$\frac{464}{1164}$ of $\$3372 = \$1344.16$ = A's gain.
$\frac{700}{1164}$ " $= \$2027.84$ = B's " } *Ans.*

5. $\$2700 \times 9 = \$24300$; $\frac{2430}{4374}$ of $\$5400 = \$3000$ A's gain.
$\$2160 \times 6 = 12960$; $\frac{1296}{4374}$ " $= \$1600$ B's "
$\$540 \times 12 = 6480$; $\frac{648}{4374}$ " $= \$800$ C's "

$\$43740$

$\$2700 + \$3000 = \$5700$ = A's share of stock.
$2160 + 1600 = 3760$ = B's " " } *Ans.*
$540 + 800 = 1340$ = C's " "

6. $\$2000 \times 4 = \$8000$
$3000 \times 5 = 15000$
$2400 \times 3 = 7200 \quad \$30200$

$\$5000 \times 6 = \$30000$
$6200 \times 5 = 31000$
$8200 \times 1 = 8200 \quad \$69200$

$\$6000 \times 4 = \$24000$
$2000 \times 4 = 8000$
$1000 \times 4 = 4000 \quad \$36000$

$\$135400$

$\frac{302}{1354}$ of $\$7570 = \$1688.44$ Crane's gain.
$\frac{692}{1354}$ " $= \$3868.86$ Child's " } *Ans.*
$\frac{360}{1354}$ " $= \$2012.70$ Coe's "

Art. 787.

2. $.08 × 20 = $1.60
.09 × 24 = 2.16
.11 × 32 = 3.52
$7.28

$.10 × 76 = $7.60.
$7.60 − $7.28 = $.32, *Ans.*

3. $1.44 × 18 = $25.92
1.32 × 6 = 7.92
1.08 × 6 = 6.48
.84 × 12 = 10.08
42) $50.40

$1.20; $1.50 − $1.20 = $.30, *Ans.*

4. $.07 × 25 × 24 = $42
.10 × 40 × 10 = 40
.13 × 50 × 4 = 26
$108

600 lb. + 400 lb. + 200 lb. = 1200 lb.
$.095 × 1200 = $114.
$114 − $108 = $6 gain, *Ans.*

5. $5.00 × 84 = $420
4.75 × 96 = 456
5.50 × 130 = 715
310 $1591 × 1.20 ÷ 310 = $6.16, *Ans.*

Art. 788.

(1) (2) (3) (4)

3.

10	½		1		1
12 11		1		2	2
14	½	½	1	1	2

Or by multiplying (1) by 4 and (2) by 2, we get 2, 2, 3 respectively. As many different answers may be obtained as different multipliers are used.

4.

		(1)	(2)	(3)	(4)	(5)	(6)	
	4	$\frac{2}{3}$		2		2	1	
	5		2		10	10	5	
$5\frac{1}{2}$	6	2		6		6	3	
	8		$\frac{2}{3}$		2	2	1	etc., etc., *Ans.*

5.

		(1)	(2)	(3)	(4)	(5)	
	$5\frac{1}{2}$	$\frac{4}{3}$		12		3	3 bbl. @ $\$5\frac{1}{2}$.
$6\frac{1}{4}$	6		4		12	3	3 " " \$6. *Ans.*
	$7\frac{3}{4}$	$\frac{2}{3}$	$\frac{2}{3}$	6	2	2	2 " " $\$7\frac{3}{4}$.

(1) × 9 gives (3); (2) × 3 = (4); $\overline{(4)+(3)} \div 4$ gives (5).

6.

	120	$\frac{1}{30}$		3		3	3 gal. @ \$1.20.
	180	$\frac{1}{30}$		3		3	3 " " \$1.80.
150	230		$\frac{1}{80}$		15	15	15 " " \$2.30.
	0		$\frac{1}{150}$		8	8	8 " water, *Ans.*

Art. 789.

2.

	40	$\frac{1}{4}$			1			1	10	
	32		$\frac{1}{12}$			1		1	10	10 cows @ \$40.
44	36			$\frac{1}{8}$			1	1	10	10 " " \$36.
	48	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	1	3	2	6	60	60 " " \$48.

3.

	80	$\frac{1}{80}$			1			1	10	10 lb. @ \$.80.
	120		$\frac{1}{40}$			1		1	10	10 " " \$1.20.
160	150			$\frac{1}{10}$			2	2	20	
	180	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	4	2	1	7	70	70 " " \$1.80.

4.

	250	$\frac{1}{10}$			9			9	12	
	350		$\frac{1}{110}$			9		9	12	12 yd. @ \$3.50.
240	*150*	$\frac{1}{90}$	$\frac{1}{90}$		1	11		12	16	16 " " \$1.50.

Art. 790.

2. $6\left\{\begin{array}{|c|c|c|c|c|c|c|}\hline 10 & \frac{1}{4} & \frac{1}{4} & 1 & 5 & 6 & 30 \\ 2 & \frac{1}{4} & & 1 & & 1 & 5 \\ 1 & & \frac{1}{5} & & 4 & 4 & 20 \\ \hline & & & & & 11 & 55 \\ \hline\end{array}\right.$ 30 men. 5 women. 20 boys. } *Ans.*

3. $60\left\{\begin{array}{|c|c|c|c|}\hline 90 & \frac{1}{30} & 2 & 66\frac{2}{3} \\ 0 & \frac{1}{60} & 1 & 33\frac{1}{3} \\ \hline & & 3 & 100 \\ \hline\end{array}\right.$ $33\frac{1}{3}$ gal. water, *Ans.*

4. $150\left\{\begin{array}{|c|c|c|c|c|c|c|}\hline 300 & \frac{1}{150} & & 4 & & 4 & 16 \\ 50 & \frac{1}{100} & & 6 & & 6 & 24 \\ 75 & & \frac{1}{75} & & 1 & 1 & 4 \\ 175 & & \frac{1}{25} & & 3 & 3 & 12 \\ \hline & & & & & 14 & 56 \\ \hline\end{array}\right.$ man labored 16 da. boy " 24 da. " " 4 da. " " 12 da.

Art. 792.

1. If the difference is $\frac{1}{3}$ of the greater number, the less must be $\frac{2}{3}$ of the greater.
Hence the greater is $\frac{3}{2}$ of 120, or 72,
and the less is $\frac{2}{3}$ of 120, or 48, *Ans.*

2. For proportionals, represent D's age by 1
E's " $1\frac{1}{2}$
F's " $5\frac{1}{4}$
$7\frac{3}{4}$

$7\frac{3}{4} : 124 :: 1 : $ D's age; D's age $= 16$ yr.
" " $1\frac{1}{2}$: E's " ; E's " $= 24$ yr.
" " $5\frac{1}{4}$: F's " ; F's " $= 84$ yr. } *Ans.*

3. 7 bu. wheat = 10 bu. rye.
5 " rye = 14 " oats.
6 " oats = $6.
$60 = x bu. wheat; x=15 bu., *Ans.*

4. $5 × 20 − $86 = $14, loss by being idle.
$14 ÷ $7 = 2, No. of days idle.
20 da. − 2 da. = 18 da., *Ans.*

5. First man in 1 hr. will build $\frac{1}{180}$ of the fence.
Second " " " $\frac{1}{720}$ "
Both men " " $\frac{7}{360}$ "
" 6 hr. " $\frac{7}{60}$ "
$1 \div \frac{7}{60} = 8\frac{4}{7}$, No. da. of 6 hr. each, *Ans.*

6. Comparing first condition with one-half the numbers in the second condition,

we find 2 boxes soap cost $6.
Hence, 1 " " $3, *Ans.*

Then, from the first condition,
6 boxes starch cost $12.
1 " " $2, *Ans.*

7. First man 1 da. + second man 1 da. do $\frac{1}{16}$ of the work.
Second " + third " $\frac{3}{40}$ "
First " + third " $\frac{7}{80}$ "
The three men working 2 da. each do $\frac{18}{80}$ "
" " " 1 " $\frac{9}{80}$ "
$1 \div \frac{9}{80} = 8\frac{8}{9}$; the number of days all will do the work.
$\frac{9}{80} - \frac{1}{16} = \frac{1}{20}$ = part the third man can do in 1 da.
$\frac{9}{80} - \frac{3}{40} = \frac{3}{80}$ = " first " "
$\frac{9}{80} - \frac{7}{80} = \frac{1}{40}$ = " second " "

Hence the first man can do the work in $26\frac{2}{3}$ da.
" second " " " 40 "
" third " " " 20 "

$\frac{3}{80}$, $\frac{1}{40}$, and $\frac{1}{20}$ are to one another as 3, 2, and 4.

$\frac{3}{9}$ of \$540=\$180, first man's share.
$\frac{2}{9}$ " =\$120, second " } *Ans.*
$\frac{4}{9}$ " =\$240, third "

8. Had he paid \$10 per bbl. for all, he would have paid \$200. The difference \$18 was caused by saving \$3 per bbl. on the second quality.

\$18÷\$3= 6, No. of bbl. @ \$7.
20— 6=14, " " \$10, *Ans.*

9. The minute-hand gains on the hour-hand 11 revolutions in 12 hours. To come together the third time after 12 M., or to gain 3 revolutions,

rev. rev. hr.
11 : 3 :: 12 : x; x=3 hr. 16 m. $21\frac{9}{11}$ sec.; or
16 m. $21\frac{9}{11}$ sec. past 3 P.M., *Ans.*

10. Taking $\frac{1}{3}$ of the numbers given in the first condition,
9 bu. wheat+18 bu. oats=\$21.
Second condition, 9 bu. wheat+ 6 bu. oats=\$15.
The difference \$6 must be the cost of 12 bu. oats.
Hence, oats cost \$.50, and wheat \$1.33$\frac{1}{3}$ per bu., *Ans.*

11. 3 da. Ames = $4\frac{1}{2}$ da. Jones.
9 " Jones = 12 " Smith.
10 " Smith = 8 " Ray.
x " Ray = 5 " Ames; x=8 da., *Ans.*

12. \$4.375×25×40÷1.045=\$4186.60, net cash cost.
\$4.625×25×40÷1.02 =\$4534.31, " receipts.
\$4534.31—\$4186.60=\$347.71, net gain, Ans.

13. If 10 bushels are added to the smaller bin, there will be 80 bushels in both; but as the larger will then contain $\frac{5}{3}$ as many bushels as the smaller, the two together will contain $\frac{8}{3}$ times the number in the smaller; hence, the smaller contains $\frac{3}{8}$ of 80 bu. less 10 bu. $=20$ bu.
the greater " $\frac{5}{8}$ " $=50$ bu.
70 bu.

14. A, B, and C can perform $\frac{1}{12}$ of the work in 1 hr.
A and B " $\frac{1}{16}$ " "
A and C " $\frac{1}{18}$ " "
C " $\frac{1}{12}-\frac{1}{16}=\frac{1}{48}$ " "
B " $\frac{1}{12}-\frac{1}{18}=\frac{1}{36}$ " "
B and C " $\frac{1}{48}+\frac{1}{36}=\frac{7}{144}$ " "
" " $\frac{7}{144}\times 9\frac{1}{7}=\frac{4}{9}$ " $9\frac{1}{7}$, *Ans.*

15. After deducting for bad debts and credit, there must still remain cost $+\overline{.125+.04}$ of cost, or 1.165 of cost. $1.165\times 1.035=1.205775$ per cent. of cost whose present worth is equal to $1.16\frac{1}{2}\%$ of cost. If 5% has been lost for bad debts, 1.205775 must be .95 of selling price.

$1.205775\div .95=1.21692+$, % of cost to equal selling price, an advance of about 27%, *Ans.*

16. Taking the younger brother's share as the standard.
Young. Bro. $=1$; $\frac{1}{3}$ of youn. bro. $=\frac{1}{3}$
Eld. " $=1\frac{1}{2}$; $\frac{1}{2}$ of eld. " $=\frac{3}{4}$; $\frac{1}{3}+\frac{3}{4}=1\frac{3}{12}$.
Amt. on int. $=1\frac{3}{12}$ of younger brother's share.
$\$2400\div 5\div .06=\$8000=$amt. on int.
$\$8000\div 1\frac{3}{12}=\$7384\frac{8}{13}$ young. brother's share.
$\$7384\frac{8}{13}\times 1\frac{1}{2}=\$11076\frac{12}{13}$ eld. " " *Ans.*

17. Height of church $= \frac{3}{4}$ height of steeple $+ 12$ ft.
Entire height $= \frac{7}{4}$ " " "
If $\frac{7}{4}$ height of steeple $+ 12$ ft. $= 268$ ft., $\frac{7}{4}$ height of steeple $= 256$ ft.
$256 \div \frac{7}{4} = 146\frac{2}{7}$ ft., height of steeple in feet.

18. B spends yearly \$100 more than his income.
A spends \$300 less than B, hence saves \$200 per yr.
$\$200 \times 4 = \$800$, *Ans.*

19. If the third has $\frac{1}{3}$ as much as the other two, he must have $\frac{1}{4}$ of the whole, or \$840.
If the second has $\frac{3}{4}$ as much as the first, together they have $\frac{7}{4}$ as much as the first.
$\$2520 - \$840 \div \frac{7}{4} = \$960$; $\$960 \times \frac{3}{4} = \$720$.
Hence, they have respectively \$960, \$720, \$840, *Ans.*

20. 4 debts due in 4, 9, 12 and 20 mo. respectively may be paid in $11\frac{1}{4}$ mo.
The amt. of \$1 at 5% for $11\frac{1}{4}$ mo. is $\$1.04\frac{11}{16}$.
Formula—*Present Worth* $\times$ *Amt. of* \$1 $=$ *Face.*
$\$1500 \times 1.04\frac{11}{16} = \$1570.31$, *Ans.*

21. 6 lb. $+ 4$ lb. $= 10$ lb. If an addition of 10 lb. gives 1 lb. more to each family, there must be 10 families.
50 lb. $\times 10 + 6$ lb. $= 506$ lb., *Ans.*

22.

Jan. 1, 1875	\$400	$\times$	0	$=$ 0
Sept. 1, "	700	$\times$	243	$=$ 170100
Apr. 1, 1876	1000	$\times$	456	$=$ 456000
	2100	$\times$	x	$= 626100$; $x = 298$.

Jan. 1, 1875 $+ 298$ da. $=$ Oct. 26, 1875, *Ans.*

23. Pres. worth of \$1 due in 2 yr., \$.87719
" " 4 " .78125
" " 8 " .64102
" " 10 " .58824
2.88770

: 8870 : .87719 :: 123251.82 : eldest's share = \$37440
" : .78125 :: " : second son's " = \$33345
" : .64102 :: " : third " " = \$27360
" : .58824 :: " : youngest " " = \$25106.82

24. \$1.20 × 1.20 ÷ .90 = \$1.60, *Ans.*

25. 104 { 75 | $\frac{1}{25}$ | 21 | 42 ; No. of geese.
125 | $\frac{1}{21}$ | 29 | 58 ; " turkeys, *Ans.*
50 | 100

26. A received $\frac{1}{3}$ estate — \$180.
B " $\frac{1}{4}$ "
A + B " $\frac{7}{12}$ " — \$180.
C " $\frac{5}{12}$ " + \$180, or the balance.
A's + B's — C's = $\frac{2}{12}$ " — \$360 = \$590.
Hence $\frac{1}{6}$ est. = \$950; whole est. \$950 × 6 = \$5700, *Ans.*

27. \$1920 × .147 = \$282.24, Sim. int.
\$1920 + \$282.24 = \$2202.24, Amt.
\$1920 × 1.1236 × 1.027 = 2215.56, Amt. at comp. int.
\$2215.56 — \$1920 = \$295.56, Comp. int.
\$1920 ÷ 1.147 = \$1673.93, Present worth.
\$1920 — \$1673.93 = \$246.07, True discount.
\$1920 × .1475 = \$283.20, Bank discount.
\$1920 — .283.20 = \$1636.80, Proceeds.
\$1920 ÷ .8525 = \$2252.20, Face of note.

NOTE.—The conditions in the above are in no wise dependent one upon another.

28. Their shares are as 1, $1\frac{1}{2}$, $2\frac{1}{4}$; $1+1\frac{1}{2}+2\frac{1}{4}=4\frac{3}{4}$.

$4\frac{3}{4}$: 1500 :: 1 : x; x=\$315.79
$4\frac{3}{4}$: 1500 :: $1\frac{1}{2}$: x; x=\$473.69
$4\frac{3}{4}$: 1500 :: $2\frac{1}{4}$: x; x=\$710.52
} *Ans.*

29. March 1, 500
June 1, 800
Aug. 1, 600, Equated time, May 27.

1000 paid Apr. 1, 56 da. before it is due, will allow the keeping of the balance \$900, 62 da. after it is due.

May 27+62 da.=July 28. \$900, July 28, *Ans.*

30. \$10302.18÷\$10640 = .96825 cost of exchange.
Int. for 63 da. = .0105
\$.97875 course of " *Ans.*

31. As often as he invests \$1 in 5-20's he invests \$2 in 5's of '81.

\$1÷1.07$\frac{3}{4}$×.06=\$$\frac{24}{431}$=income from \$1 in 5-20's.
\$2÷ .98$\frac{3}{4}$×.05=\$$\frac{8}{79}$ = " \$2 " 5's of '81.
\$$\frac{24}{431}$+\$$\frac{8}{79}$=\$$\frac{6344}{34049}$, income from \$3 invested.
\$1674÷$\frac{6344}{34049}$=\$10665.80=amt. invested in 5-20's.
\$10665.80×2=\$21331.60 = " 5's of '81.

32.

48	45	$\frac{1}{3}$	$\frac{1}{3}$	1	2	3	3600	No. of bu. A furnishes.
	51	$\frac{1}{3}$		1		1	1200	" B "
	54		$\frac{1}{3}$		1	1	1200	" C "
						5	6000	

33. \$4.50×42.75=\$192.375, cost @ \$4.50 per U. S. gal.
231×42.75÷277.274=35.6154, No. Imp. gal.
£1.1×35.6154=£39.17694.
\$4.8665×39.17694=\$190.6545, cost @ £1.25 per Imp. gal. \$192.375−\$190.6545=\$1.72, *Ans.*

34. 300 ft. $-$ $\overline{20 \text{ ft.} \times 2}$ = 260 ft., width of garden remaining.

Walk 40 ft. wide : garden 260 ft. wide :: 2 : 13 ; $\frac{2}{13}$, *Ans.*

35.

June	3,	200 bbl.	@	\$6.25	= \$1250
"	30,	350 "	"	6.50	= 2275
July	29,	400 "	"	6.12½	= 2450
Aug.	6,	50 "	"	6.00	= 300
		Total amt. of sales,			\$6275

Average date of above sales (Art. **739**), June 3 + 35 da., July 8.

Storage	200 bbl.	5 wk.	@	\$.02	= \$20
"	350 "	9 "	"	"	= 63
"	400 "	13 "	"	"	= 104
"	50 "	14 "	"	"	= 14

Storage due day of last sale, Aug. 6, \$201

Commission on \$6275 @ 3½% = \$219.63. Due July 8.

Charges paid May 1, \$240.10.

Due.	Amt.	Da.	Prod.	Due.	Amt.	Da.	Prod.
May 1,	240.10	× 0 =	0	July 8,	6275	× 68 =	426700
July 8,	219.63	× 68 =	14934.84				
Aug. 6,	201	× 97 =	19497				
	660.73		34431.84		6275		426700
					660.73		34431.84
Balance due \$5614.27.					5614.27		) 392268.16
To be paid May 1, + 70 da. = July 10.							70.00

36. \$4800 $-$ \$3840 = \$960, L's gain in 6 mo. = 4⅙% per mo.

\$9600 ÷ (1 + $\overline{4\frac{1}{6} \times 12}$) = \$6400, M's capital.
\$4160 $-$ \$2560 ÷ $\overline{\$2560 \times .04\frac{1}{6}}$ = 15 mo., N's time. } *Ans.*

37. $536.78 + int. for 3 mo. 8 da. = $545.55
$425.36 + " 2 " 4 " = 429.90
$259.25 + " 1 " 20 " = 261.41
$786.36 = 786.36
April 24. $2023.22, *Ans.*

38. The portion of the principal paid each year must be such that the first payment at comp. int. for 3 years, the 2d for 2 years, and the last for 1 year will all be equal. These payments will be proportional to the present worth of $1, due respectively in 3, 2, and 1 year.

Hence, $\frac{1}{(1.06)^3}$, $\frac{1}{(1.06)^2}$, and $\frac{1}{(1.06)}$, are the proportional quantities. Reducing these to a common denominator and taking the numerators, we have 1, 1.06, and 1.1236.

Their sum, 3.1836 : 1 :: 6000 : x, the principal paid the first year. x=$1884.66, to this add one year's int. on $6000, $360, and we have for the full payment, $2244.66.

Art. 802.

2. 37×37; 42×42; 56×56; 75×75.
Ans. 1369; 1764; 3136; 5625.

3. $15 \times 15 \times 15 = 3375$; $18 \times 18 \times 18 = 5832$, etc., *Ans.*

4. $63 \times 63 = 3969$; $48 \times 48 \times 48 = 110592$.
$32 \times 32 \times 32 \times 32 = 1048576$.
$12 \times 12 \times 12 \times 12 \times 12 = 248832$.
} *Ans.*

6. $\frac{7}{16} \times \frac{7}{16} = \frac{49}{256}$; $\frac{12}{31} \times \frac{12}{31} \times \frac{12}{31} = \frac{1728}{29791}$, *Ans.*

7. $\frac{9}{14} \times \frac{9}{14} \times \frac{9}{14} \times \frac{9}{14} = \frac{6561}{38416}$.
$\frac{5}{8} \times \frac{5}{8} \times \frac{5}{8} \times \frac{5}{8} \times \frac{5}{8} = \frac{3125}{32768} = 97\frac{21}{32}$.
} *Ans.*

8. $25.4 \times 25.4 = 645.16$, *Ans.*

9. $106 \times 106 \times 106 = 1191016$, *Ans.*

10. $17\frac{1}{4} \times 17\frac{1}{4} = \frac{313209}{16} = 1958\frac{1}{16}$, *Ans.*

11. $\frac{11}{15} \times \frac{11}{15} \times \frac{11}{15} \times \frac{11}{15} = \frac{14641}{50625}$, *Ans.*

12. $.0342 \times .0342 = .00116964$, *Ans.*

13. $.5 \times .5 \times .5 \times .5 \times .5 \times .5 = .015625$, *Ans.*

14. $36.02 \times 36.02 \times 36.02 = 46733.803208$, *Ans.*

15. $.40316 \times .40316 \times .40316 = .065528814274496$, *Ans.*

16. $182\frac{1}{8} = \frac{1457}{8}$; $\frac{1457}{8} \times \frac{1457}{8} = 33169\frac{33}{64}$, *Ans.*

17. $4.075 \times 4.075 = 16.605625$, *Ans.*

18. $1.9 \times 1.9 \times 1.9 \times 1.9 \times 1.9 = 24.76099$, *Ans.*

19. $.0063 \times .0063 \times .0063 = 000000250047$, *Ans.*

20. $4.6 \times 4.6 \times 4.6 \times 25 \times 25 \times 25 = 1520875$, *Ans.*

21. $6.75 \times 6.75 \times 6.75 \times 6.75 - \overline{7.25 \times 7.25} = 2023.37890625$, *Ans.*

22. $\frac{7}{8} \times \frac{7}{8} \times \frac{7}{8} \times \frac{7}{8} \times \frac{29}{8} \times \frac{29}{8} = 5.887$, *Ans.*

23. $8 \times 8 \times 8 \times 8 \times 8 \times 8 \div .4096 = 640000$, *Ans.*

24. $2.5 \times 2.5 \times 2.5 \times 12.75 \times 12.75 = 2540.0390625$, *Ans.*

25. $7.5 \times 7.5 \times 7.5 \div (1.5 \times 1.5 \times 1.5) = 125$, *Ans.*

26. $4 \times 4 \times 4 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 12 \times 12 \times 12 \div (4 \times 4 \times 10 \times 10 \times 10 \times 10 \times 3 \times 3) = 1200$, *Ans.*

Art. 803.

3. $42^2 = 40^2 + 2^2 + \overline{2 \times 40 \times 2} = 1764$, *Ans.*

4. $48^2 = 40^2 + 8^2 \times \overline{2 \times 40 \times 8} = 2304$, *Ans.*

5. $56^2=50^2+6^2+\overline{2\times50\times6}=3136$, *Ans.*

6. $98^2=90^2+8^2+\overline{2\times90\times8}=9604$, *Ans.*

7. $125^2=120^2+5^2+\overline{2\times120\times5}=15625$, *Ans.*

8. $105^2=100^2+5^2+\overline{2\times100\times5}=11025$, *Ans.*

9. $225^2=220^2+5^2+\overline{2\times220\times5}=50625$, *Ans.*

10. $197^2=190^2+7^2+\overline{2\times190\times7}=38809$, *Ans.*

11. $342^2=340^2+2^2+\overline{2\times340\times2}=116964$, *Ans.*

Art. 804.

2. $34^3=30^3+\overline{3\times30^2\times4}+\overline{3\times30\times4^2}+4^3=39304$, *Ans.*

4. $48^3=40^3+\overline{3\times40^2\times8}+\overline{3\times40\times8^2}+8^3=110592$, *Ans.*

5. $64^3=60^3+\overline{3\times60^2\times4}+\overline{3\times60\times4^2}+4^3=262144$, *Ans.*

6. $95^3=90^3+\overline{3\times90^2\times5}+\overline{3\times90\times5^2}+5^3=857375$, *Ans.*

7. $125^3=120^3\times\overline{3\times120^2+5}+\overline{3\times120\times5^2}+5^3=1953125$.

Art. 810.

2. $64=2.2.2.2.2.2$; $2.2.2=8$, *Ans.*
$256=2.2.2.2.2.2.2.2$; $2.2.2.2=16$, *Ans.*
$576=2.2.2.2.2.2.3.3$; $2.2.2.3=24$, *Ans.*
$6561=3.3.3.3.3.3.3.3$; $3.3.3.3=81$, *Ans.*

3. $729=3.3.3.3.3.3$; $3.3=9$, *Ans.*
$2744=2.2.2.7.7.7$; $2.7=14$, *Ans.*
$9261=3.3.3.7.7.7$; $3.7=21$, *Ans.*
$3375=3.3.3.5.5.5$; $3.5=15$, *Ans.*

Art. 813.

3. 72'25 (85, *Ans.*

64

165) 825

825

0

4. 5'85'64 (242, *Ans.*

4

44) 185

176

482) 964

964

0

16. 1'96.13'69 (14.0048+, *Ans.*

1

24) 96

96

28004) 136900

112016

280088) 2488400

2240704

18. 58.14'06'25 (7.625, *Ans.*

49

146) 914

876

1522) 3806

3044

15245) 76225

76225

0

22. 9.00'00'99'40'09 (3.0000165

9

600001) 0000994009

600001

6000026) 39400800

36000156

60000325) 340064400

NOTE.—For every cipher in the root annex one cipher to the trial divisor, also one period to the dividend.

25. $\sqrt{\frac{5}{6}} = \sqrt{.833333333333} = .91287+$, *Ans.*

27. $\sqrt{.1369}=.37$; $\sqrt{1296}=36$; $36+.37=36.37$, *Ans.*

28. $\sqrt{36.36}=6.02992+$; $\sqrt{.25^2}=.25$;
$6.02992\times.25=1.50748+$, *Ans.*

29. $2.8^3=21.952$; $\sqrt{.117649}=.343$;
$21.952\div.343=64$, *Ans.*

30. $\sqrt{\frac{3136}{7056}}=\frac{56}{84}=\frac{2}{3}$; $\sqrt{\frac{225}{2025}}=\frac{15}{45}=\frac{1}{3}$; $\frac{2}{3}-\frac{1}{3}\div4=\frac{1}{12}$.

31. $\frac{9^{\frac{1}{2}}}{\sqrt{3^2}}=\frac{3}{3}=1$; $\frac{3^2}{\sqrt{9^2}}=\frac{9}{9}=1$; $1\times1=1$, *Ans.*

32. $\sqrt{2.6896}=1.64$; $\sqrt{.256}=.5059+$;
$1.64+.3729\times.75\times.5059=1.78+$.

33. $\sqrt{27.04}=5.2$; $(7.2-5.2)^5=32$; $(\frac{2}{3})^2=\frac{4}{9}$;
$32\div\frac{4}{9}=72$, *Ans.*

34. $\sqrt{81}-\sqrt{16}=9-4=5$; $\sqrt{169}+\sqrt{25}=13+5=18$;
$5\times18=90$, *Ans.*

35. $\sqrt{264^2}=264$; $\sqrt{5.3361}=2.31$; $2.3^2=12.167$;
$\sqrt{3.61}=1.9$;
$264\times4.41\div2.31-(12.167\times1.9)=480.8827$, *Ans.*

Art. 815.

1. $\sqrt{1016064}=1008$, length of side in feet, *Ans.*

2. $\sqrt{160\times361}=240.33$, length of side in rods, *Ans.*

3. $\sqrt{208\times13}=52$, length of side in rods, *Ans.*

4. 251 A. 65 P. = 40225 P.;
$\sqrt{40225}=200.56+$, *Ans.* in rods.

5. $\sqrt{21170.25}=145.5$, rods square, *Ans.*

6. $\sqrt{216\times 24}=72$, length of side of square in rods.
Distance around rectangular field is 480 rods.
" " square " 288 "
rd. rd.
480 : 288 :: \$312 : x ; x=\$187.20, *Ans.*

Art. 819.

3. 15'625 (25, *Ans.*

		8
3×20^2	= 1200	7625
$3\times 20\times 5$ =	300	
5^2=	25	
	1525	7625
		0

4. 166'375 (55, *Ans.*

		125
3×50^2	= 7500	41375
$3\times 50\times 5$ =	750	
5^2=	25	
	8275	41375
		0

5. 1'030'301 (101, *Ans.*

		1
3×100^2	= 30000	30301
$3\times 100\times 1$ =	300	
1^2=	1	
	80301	30301
		0

Annexing 2 ciphers to trial divisor, as in note 1 under rule. gives trial divisor 30000, or say 3×100^2.

9. $4'080'659'192$ (1598, *Ans.*

			1
3×10^2	=	300	3080
$3\times10\times5$	=	150	
5^2	=	25	
		475	2375
3×150^2	=	67500	705659
$3\times150\times9$	=	4050	
9^2	=	81	
		71631	644679
3×1590^2	=	7584300	60980192
$3\times1590\times8$	=	38160	
8^2	=	64	
		7622524	60980192
			0

10. $\sqrt[3]{\frac{1000}{1331}} = \frac{\sqrt[3]{1000}}{\sqrt[3]{1331}} = \frac{10}{11}$, *Ans.*

11. $\sqrt[3]{\frac{13824}{17576}} = \frac{24}{26}$, *Ans.*

12. $\sqrt[3]{2\frac{7}{8}} = \sqrt[3]{2.875} = 1.42+$, *Ans.*

13. $\sqrt[3]{39304} = 34$, *Ans.*

14. $\sqrt[3]{.091125} = .45$, *Ans.*

15. 12.812'904 (2.34, *Ans.*

8

3×20^2 =	1200	4812
$3 \times 20 \times 3$ =	180	
3^2 =	9	
	1389	4167
3×230^2 =	158700	645904
$3 \times 230 \times 4$ =	2760	
4^2 =	16	
	161476	645904
		0

16. 98'867'482'624 (4624, *Ans.*

64

3×40^2 =	4800	34867
$3 \times 40 \times 6$ =	720	
6^2 =	36	
	5556	33336
3×460^2 =	634800	1531482
$3 \times 460 \times 2$ =	2760	
2^2 =	4	
	637564	1275128
3×4620^2 =	64033200	256354624
$3 \times 4620 \times 4$ =	55440	
4^2 =	16	
	64088656	256354624
		0

17. .000'529'475'129 (.0809, *Ans.*

	512
1920000	17475129
21600	
81	
1941681	17475129
	0

There being a cipher in the root, annex 2 ciphers to the original trial divisor for a new one.

18. $\sqrt[3]{\frac{1}{8}}=\sqrt[3]{.500}=.7936+$, *Ans.*

19. $\sqrt[3]{1.44}=1.126+$; $2.5^{\frac{5}{3}}=\sqrt[3]{2.5^5}=4.605+$; $1.126+4.605=5.73+$, *Ans.*

20. $\sqrt[3]{\frac{1331}{3375}}=\frac{11}{15}$; $\sqrt[3]{\frac{125}{512}}=\frac{5}{8}$; $\frac{11}{15}\times\frac{5}{8}=\frac{11}{24}$, *Ans.*

21. $\sqrt[3]{.4096-.2368}=\sqrt[3]{.1728}=.5569+$, *Ans.*

22. $\sqrt[3]{54.872}=3.8$; $\sqrt[3]{21.952}=2.8$; $3.8-2.8=1$, *Ans.*

23. $\sqrt[3]{103.823}=4.7$; $\sqrt[3]{.125}=.5$; $24.8+4.7\times.5=14.75$.

24. $\sqrt[3]{16^6}=16^{\frac{6}{3}}=16^2=256$; $\sqrt[3]{64}=4$; $\sqrt[3]{.512}=.8$; $256\div4-(4\times.8)=60.8$, *Ans.*

Art. 821.

1. $\sqrt[3]{46656}=36$; 36 in., or 3 feet, *Ans.*

2. $\sqrt[3]{16\times8\times4}=8$; 8 feet, *Ans.*

3. $\sqrt[3]{32\times27\times16}=24$; 24 in., or 2 feet, *Ans.*

4. $\sqrt[3]{91125}=45$; edge of cube 45 ft.; $45^2\times6=12150$.

5. $\sqrt[3]{2150.42\times150}=68+$; 68 in., or 5 ft. 8 in. +, *Ans.*

6. $\sqrt[3]{231\times31\frac{1}{2}\times200}=113.3$; 9 ft. 5.3 in. +, *Ans.*

7. $\sqrt[3]{231\times4000}=97.4$; 97.4 in., or 8 ft. 1.4 in., *Ans.*

Art. 822.

2. The 4th root equals the square root of the sq. root.
$\sqrt{5636405776}=75076$; $\sqrt{75076}=274$, *Ans.*

3. $\sqrt{1099511627776}=1048576$; $\sqrt{1048576}=1024$;
$\sqrt{1024}=32$, *Ans.*

4. $\sqrt{2563297285044 2049}=160103007$;
$\sqrt[3]{160103007}=543$, *Ans.*

5. $\sqrt[3]{1.577635}=1.1641+$; $\sqrt[3]{1.1641}=1.05+$, *Ans.*

Art. 829.

3. $203-\overline{39\times5}=8$, *Ans.*

4. $1+\overline{8\times2}=17$, *Ans.*

5. $5+\overline{7\times4}=33$, *Ans.*

6. $2+\overline{49\times3}=149$, *Ans.*

7. $100-\overline{12\times7}=16$; *Ans.*

8. $\frac{2}{3}+\overline{19\times\frac{3}{8}}=7\frac{19}{24}$, *Ans.*

Art. 830.

2. $17-1\div8=2$, *Ans.*

3. $15-3\div6=2$, *Ans.*

4. $51-1\div75=\frac{2}{3}$, *Ans.*

5. $44-8\div9=4$, *Ans.*

6. $4160-800\div60=56$; $56\div800=.07$; 7%, Ans.

NOTE.—In 60 yr. the interest is added 60 times, making with the first term 61 terms.

7. $2\frac{1}{2}-0\div17=\frac{5}{34}$, *Ans.*

Art. 831.

2. $17-1\div 2+1=9$, *Ans.*

3. $75-5\div 5+1=15$, *Ans.*

4. $20-\frac{1}{2}\div 6\frac{1}{2}+1=4$, *Ans.*

5. $1.54-.50\div 4+1=27$, *Ans.*

6. $\$500\times .07=\$35=$ com. difference.

$885-500\div 35=11$, the No. of years, *Ans.*

The number of terms in the series is 1 more, or 12.

Art. 832.

2. $5+75\times\overline{15\div 2}=600$, *Ans.*

3. $4+40\times\overline{7\div 2}=154$, *Ans.*

4. $250+0\times\overline{1000\div 2}=125000$, *Ans.*

5. $1+12\times\overline{12\div 2}=78$, *Ans.*

6. $48\frac{1}{4}-16\frac{1}{12}=32\frac{1}{6}$, com dif.

$16\frac{1}{12}+\overline{59\times 32\frac{1}{6}}=1913\frac{11}{12}$, last term.

$16\frac{1}{12}+1913\frac{11}{12}\times\overline{60\div 2}=57900$, *Ans.*

Art. 840.

3. $1\times(\frac{1}{2})^8=\frac{1}{256}$, *Ans.*

4. $6\times 4^5=6144$, *Ans.*

5. $192\div 2^6=3$, *Ans.*

6. $\$1\times 2^{19}=\$524288$, *Ans.*

7. $\$250\times 1.06^4=\$315.619+$, *Ans.*

8. $1874-1634\div 12=20$, the No. of times it doubled.

$20+1=21$, No. of terms.

$1\times 2^{20}=1048576$ cents; $10485.76, *Ans.*

Art. 841.

2. $\frac{1}{256} \div 1 = \frac{1}{256}$; $\sqrt[8]{\frac{1}{256}} = \frac{1}{2}$, *Ans.*

3. $5000 \div 8 = 625$; $\sqrt[4]{625} = 5$, *Ans.*

4. $\sqrt[4]{7 \div .0112} = 5$, *Ans.*

5. $15\frac{3}{16} \div \frac{1}{48} = 729$; $\sqrt[6]{729} = 3$, *Ans.*

Art. 842.

2. $\frac{1}{256} \div 1 = \frac{1}{256}$; $(\frac{1}{2})^x = \frac{1}{256}$; $x = 8$;
$8 + 1 = 9$, No. terms, *Ans.*

3. $1458 \div 2 = 729$; $3^x = 729$; $x = 6$;
$6 + 1 = 7$, No. terms, *Ans.*

4. $\frac{1}{8} \div \frac{1}{640} = 128$; $2^x = 128$; $x = 7$;
$7 + 1 = 8$, No. terms, *Ans.*

Art. 843.

3. $384 \times 2 - 3 \div 1 = 765$, *Ans.*

4. $\frac{8}{405} \times \frac{1}{3} = \frac{8}{1215}$; $4\frac{8}{3} - \frac{8}{1215} \div \frac{2}{3} = 7\frac{77}{405}$, *Ans.*

5. $8 - \overline{0 \times \frac{1}{2}} \div \frac{1}{2} = 16$, *Ans.*

6. $1 - \overline{0 \times \frac{1}{3}} \div \frac{2}{3} = 1\frac{1}{2}$, *Ans.*

7. $1 - \overline{0 \times \frac{1}{2}} \div \frac{1}{3} = 2$, *Ans.*

8. $7 \times 3^3 = 189 =$ last term; $189 \times 3 - 7 \div 2 = 280$, *Ans.*

9. $1 \times 2^9 = 512 =$ last term; $512 \times 2 - 1 \div 1 = \$1023$.

10. $2 \times 3^{11} = 354294$, last term;
$354294 \times 3 - 2 \div 2 = 531440$; *Ans.* in cts. $= \$5314.40$.

Art. 853.

3. $5\frac{1}{4}$ yr. = 22 quarters.

$\$150 \times .015 = \$2.25$, com. dif.

$\$150 + \overline{\$2.25 \times 21} = \$197.25$, last term.

$\$150 + \$197.25 \times 22 \div 2 = \$3819.75$, *Ans.*

4. $\$300$ = first term.

$\$300 \times .06 = \$18$, com. dif.

$\$300 + \overline{\$18 \times 4} = \$372$, last term.

$\$300 + \$372 \times 5 \div 2 = \$1680$, sum of terms = amt. of annuity.

$\$1680 \div 1.30 = \$1292.31$, Pres. worth, *Ans.*

5. $\$500$ = first term.

$\$500 \times .10 = \$50$, com. dif.

$\$500 + \overline{\$50 \times 9} = \$950$, last term.

$\$500 + \$950 \times 10 \div 2 = \$7250$, sum.

$\$7250 \div 2 = \$3625$, *Ans.*

6. $\$3450 \div \$500$, shows that without interest the time would be less 7 years.

$500 \times .06 = 30$, com. dif.

$500 + 530 + 560$, etc., to amt. to 3450, requires 6 terms. Hence, 6 years, *Ans.*

7. $s = (a + l) \times \frac{n}{2}$; $\$59760 = (\$6000 + l)\,4 = \$24000 + 4l$.

Whence $4\,l = \$35760$, or $l = \$8940$.

$\frac{l - a}{n - 1} = d.$; $\frac{\$8940 - \$6000}{7} = \$420 = d.$

$\$420 \div \$6000 = .07$, or 7%, *Ans.*

8. 1 yr. 6 mo. = 18 mo.; No. terms 18.
$20 × .06 ÷ 12 = $.10 = difference.
$20 + $.10 × 17 = $21.70, last term.
$20 + $21.70 × 18 ÷ 2 = $375.30. *Ans.*

Art. 854.

3. No of terms = 25.
Ratio = 1.06.
First term = 1.
Last term = $1 \times (1.06)^{24} = (1.06)^{24}$.
Sum = $(1.06)^{24} \times 1.06 - 1 \div .06 = 54.8645$.

If an annuity of $1 amounts to $54.8645, to amount to $16459.35 will require as many dollars of annuity as $16459.35 ÷ 54.8645 = $300, *Ans.*

4. $700 × $(1.06)^7$ − $700 ÷ .06 = $5875.683, amount.
$5875.683 ÷ 1.50363 = $3907.665, *Ans.*

5. $200 × $(1.06)^{12}$ − $200 ÷ .06 = $3373.99, amount.
Amt. of $1 for 18 yr. = $2.854339.
$3373.99 ÷ 2.854339 = $1182.05 +, *Ans.*

6. This may be considered a geometrical series, of which the first term is the present worth of $600 due in 8 yr., and the last term the pres. worth of $1 due in 1 year.
$600 ÷ 1.593848 = $376.45, first term.
$600 ÷ 1.06 = $566.04, last term.
($566.04 × 1.06 − $376.45) ÷ .06 = $3725.87 +, *Ans.*

7. $100 × 2.653298 − $100 ÷ .05 = $3306.596. amt.
$3306.596 ÷ 5.253348 = $629.43, *Ans.*;
Present worth of $3306.596 due in 34 years @ 5%.

Art. 882.

2. $30 \times 40 \div 2 = 600$; area, 600 square feet, *Ans.*

3. $12.5 \times 6.75 \div 2 = 42.1875$; area, $42\frac{3}{16}$ sq. ft., *Ans.*

4. $25.01 \times 18.14 \div 2 = 226.84$; area, 22 A. 6 ch. 13.45 P.

5. $\$60 \times (15.48 \times 9.67 \div 2 \div 10) = \$449.07$, *Ans.*

6. $\$.40 \times \overline{35 \times 21 \div 2} = \$147$, *Ans.*

7. $28 \times 15 \div 2 = 210$; area, 210 square feet, *Ans.*

Art. 883.

2. $20\frac{1}{4} \times 2 \div 9 = 4.5$; $4\frac{1}{2}$ feet, *Ans.*

3. $65 \times 2 \div 10 = 13$; 13 in., *Ans.*

4. $588 \times 2 \div 42 = 28$; 28 rods, *Ans.*

5. $6\frac{1}{2}$ A. $\times 160 \times 30\frac{1}{4} \times 2 \div 17 = 3701\frac{3}{17}$;
$3701\frac{3}{17}$ yd. $= 672$ rd. $5\frac{3}{17}$ yd., *Ans.*

6. 5 A. 33 P. $= 833$ P.; 12.25 ch. $= 49$ rd.;
$833 \times 2 \div 49 = 34$; 34 rd. $= 8\frac{1}{2}$ ch., *Ans.*

7. $\$1050 \div \$5.25 = 200$; $200 \times 2 \div 8 = 50$; 50 rd., *Ans.*

Art. 884.

2. $\frac{20+15+15}{2} = 25$; $25-20=5$; $25-15=10$;
$25-15=10$; $\sqrt{25 \times 5 \times 10 \times 10} = 111.85$;
111.85 square feet, *Ans.*

3. $\frac{25+36+49}{2} = 55$; $55-25=30$; $55-36=19$;
$55-49=6$; $\sqrt{55 \times 30 \times 19 \times 6} = 433.7$;
3 sq. ft. 1.7 sq. in., *Ans.*

4. Half-sum=105 ; 105−70=35.
$\sqrt{105\times35\times35\times35}\div160=13.26$; 13 A. 41.76 P.

5. $\frac{30+20+18}{2}=34$; 34−30=4 ; 34−20=14 ;
34−18=16 ; $\sqrt{34\times4\times14\times16\times2}=349.07$;
349.07 square feet, *Ans.*

Art. 886.

2. $\sqrt{36^2+15^2}=39$; 39 feet, *Ans.*

3. $\sqrt{20^2+16^2}=25.6$; 25 ft. 7.34 in., *Ans.*

4. $\sqrt{25^2+23^2}=33.97$; 33.97 chains, *Ans.*

5. $\sqrt{20^2+16^2}=25.61$; $\sqrt{25.61^2+12^2}=28.28$;
28 ft. 3.36 in., *Ans.*

Art. 887.

2. $\sqrt{53^2-28^2}=45$; 45 yards, *Ans.*

3. $\sqrt{15^2+12^2}=19.209$; 19 ft. 2.5 in., *Ans.*

4. $\sqrt{380^2-120^2}=360.5$; 360 ft. 6$\frac{3}{4}$ in., *Ans.*

5. $\sqrt{52^2-48^2}=20$; 20 feet, *Ans.*

Art. 898.

2. 10.5×8=84 ; area, 84 square feet, *Ans.*

3. 8.75×6÷10=5$\frac{1}{4}$; area, 5$\frac{1}{4}$ acres, *Ans.*

Art. 899.

2. $\overline{178+146}\div2\times69=11178$; area, 11178 sq. ft.

3. $(18+25\div2\times16)\div12=28\frac{2}{3}$; area, 28$\frac{2}{3}$ sq. ft., *Ans.*

4. $(38+26\div2\times10)\div160=2$; area, 2 acres, *Ans.*

Art. 900.

2. $(9+3\div2)\times35.5=213$; area, 213 square feet, *Ans.*

3. $(20.453+50.832\div2\times80)\div160=17.82\frac{1}{8}$;
Area, $17.82\frac{1}{8}$ acres, *Ans.*

Art. 904.

3. 50 ft.$\div3.1416=15.9$ ft.$+=15$ ft. 10.9 in.$+$, *Ans.*

4. 18.5 ft.$\div3.1416=5.88$ ft.$+=5$ ft. 10.6$+$ in., *Ans.*

5. 31.416 ft.$\div3.1416\div2=5$ feet, *Ans.*

6. 14 in.$\times2\times3.1416=87.96$ in.$+=7$ ft. 3.96 in., *Ans.*

Art. 905.

4. 200 ch.$\times\overline{(200\div3.1416\div4)}\div10=318.3$;
Area, 318.3 acres, *Ans.*

5. 480 rd.$\times\overline{(480\div3.1416\div4)}\div160=114.59$;
Area, 114.59 acres, *Ans.*

Art. 906.

3. $\sqrt{38.4846\div.7854}=7$; diameter, 7 rods, *Ans.*

4. $\sqrt{286.488\div.7854}=19.098$; diam., 19.098 ft., *Ans.*
19.098 ft.$\times3.1416=59.998+$; circum., 59.998 ft., *Ans.*

Art. 907.

2. $\sqrt{200^2\div2}=141.42$; 141.42 feet, *Ans.*

3. $104\div3.1416\times.7071=23.4+$; 23.4 yd.$+$, *Ans.*

4. $\sqrt{78.54\div.7854}=10$; diameter, 10 feet.
10 ft.$\times.7071=7.07+$; 7.07 feet$+$, *Ans.*

Art. 908.

2. $\overline{7.75+4.25} \times \overline{7.75-4.25} \times .7854 = 32.98+$;
32.98 square feet, *Ans.*

3. $(35.75+16.25)\ (35.75-16.25) \times .7854 = 796.39+$;
796.39 square feet, *Ans.*

4. 1 A. 154.16 P. = 314.16 P.;
$\sqrt{314.16 \div .7854} = 20$ rd., diameter.

$\overline{20+10} \times \overline{20-10} \times .7854 = 235.62$ P. = 1 A. 75.62 P., area of land.
314.16 sq. rd. − 235.62 sq. rd. = 78.54 P., area of water. } *Ans.*

Art. 909.

2. $\sqrt{42 \times 168} = 84$, *Ans.*

3. $\sqrt{64 \times 12.25} = 28$, *Ans.*

4. $\sqrt{\frac{36}{49} \times \frac{4}{81}} = \frac{4}{21}$, *Ans.*

5. $\sqrt{36 \times 20} = 32.86+$; 32.86 pounds, *Ans.*

Art. 910.

5. 283 A. 107 P. = 45387 P.
$3 : 45387 :: 3^2 : x^2$; $x = 369 : 369$ rods long, *Ans.*
$3 : 45387 :: 1^2 : x^2$; $x = 123$ rods wide, *Ans.*

6. $55.1 : 300 :: 1.5^2 : x^2$; $x = 3.5$ in., *Ans.*

1. The area of a triangle whose sides are 13, 14 and 15 ft., is 84 sq. ft.

$84 : 24276 :: 13^2 : x^2$; $x = 221$ feet.
$84 : 24276 :: 14^2 : x^2$; $x = 238$ feet.
$84 : 24276 :: 15^2 : x^2$; $x = 255$ feet. } *Ans.*

8. The cost to inclose depends upon the circumference. We then consider the cost as a representative of the circumference.

$1 : \frac{1}{3} :: 167.7^2 : x^2$; $x = \$75$, *Ans.*

9. 2 A. : 8 A. :: 63.39^2 rd. : x^2 rd.; $x = 126.78$ rd., *Ans.*

Art. 911.

1. 20 A. = 3200 P.; $\sqrt{3200} \times 4 = 226.274+$, perimeter of square.

$\$2.40 \times 226.274 = \$543.16$, cost.

$\frac{1}{2} : 3200 :: 1^2 : x^2$; $x = 126.491$, length in rods.

$\frac{1}{8} : 3200 :: \frac{1}{8}^2 : x^2$; $x = 25.298+$, width in rods.

$126.491 + 126.491 + 25.298 + 25.298 = 303.578+$, perimeter of rectangle.

$\$2.40 \times 303.6 = \$728.59$, cost of rectangle.

$\$728.59 - \$543.16 = \$185.53$, *Ans.*

2. $\sqrt{25^2 + 20^2 + 15^2} = 35.35$; 35.35 feet, *Ans.*

3. $1\frac{1}{4}$ sq. mi. = 128000 P.

$\sqrt{128000 \div .7854} = 403.7+$; 403.7 rods, *Ans.*

4. $\$75 \times (\overline{40 + 22} \div 2 \times 25) \div 10 = \$5812.50$, *Ans.*

5. The altitude of this rhombus is that of a right-angled triangle, whose hypothenuse is 15 ft. and base 9 ft.

$\sqrt{15^2 - 9^2} = 12$; 12 feet the altitude.

$\$.18 \times \overline{15 \times 12} = \$32.40$, *Ans.*

6. $\sqrt{50^2 - 4^2} = 49.839 =$ radius; diameter, 99.678 ft.

99.678 ft. $\times$ 3.1416 = 313.14 ft. = circumference,

$\overline{99.678 \times 313.14} \div 4 = 7803.79$;

7803.79 sq. ft. = 28.66 P., area, *Ans.*

7. $40^2-(\sqrt{40^2\div 2})^2=800$; 800 P.=5 A., *Ans.*

8. Half-sum of sides=71; 71−40=31; 71−48=23; 71−54=17; $\sqrt{71\times 31\times 23\times 17}=927.68$; $\$125\times\sqrt{927.68\div 160}=\$724.75$, *Ans.*

9. $1:4::10^2:x^2$; $x=20$; 20 feet, *Ans.*

10. $200^2\times .7854\div 2=15708$; 15708 P.=98 A. 28 P.

11. $2:1::100^2:x^2$; $x=70.71$, side of garden, inside the walk in rods.

100 ft.−70.71 ft.÷2=14.645 ft.+, *Ans.*

12. 540 A. 36 P.=86436 P.; $\sqrt{86436}=294$; 294 rd. $\sqrt{86436\div 42}=45.36$; 45.36 rd., *Ans.*

13. 15 A.=2400 P.; 2400÷30=80; 80 rd., length.

80 rd.=1320 ft.; $\sqrt{1320^2-120^2}=1314.5$;

1314.5 ft.=79.668 rd.; $79.668\times 30\div 160=14.9377$;

14 A. 150.04 P., *Ans.*

14. $12:48::3^2:x^2$; $x=6$; 6 inches, *Ans.*

Art. 918.

4. $6\times 3.1416\times 8+(6^2\times .7854\times 2)=207.3456$; 207.34 sq. ft.+, *Ans.*

5. $(4\frac{3}{8}+4\frac{3}{8}+3\frac{1}{4}+3\frac{1}{4})\times 8\frac{1}{4}+(4\frac{3}{8}\times 3\frac{1}{4}\times 2)=168\frac{7}{8}$; $168\frac{7}{8}$ sq. ft., *Ans.*

6. $(4\times 2\times 3.1416\times 6.5)+\overline{(4\times 2^2\times .7854\times 2)}=263.8944$; 263.8944 sq. ft., *Ans.*

7. $15\times 18+(\frac{1}{2}$ of $\sqrt{6^2-3^2}\times 6\times 2)=301.176$; 301.176 sq. ft., *Ans.*

Art. 919.

3. $6.5 \times 6.5 \times 6.5 = 274.625$; $274\frac{5}{8}$ cu. ft., *Ans.*

4. $\$.30 \times 1.5 \times 1.5 \times 40 = \$27$, *Ans.*

5. $\overline{2.5^2} \times .7854 \times 15 = 73.63$; 73.63 cu. ft., *Ans.*

6. $7.9 \div 3.1416 = 2.5146+$, diameter.
$2.5146 \div 4 \times 7.9 = 4.966+$, area.
$\$.45 \times 4.9722 \times 24 = \$53.63$, *Ans.*

Art. 925.

2. $17.5 \text{ ft.} \times 3.1416 = 54.978$ feet, circumference ;
$54.978 \text{ ft.} \times \overline{30 \div 2} = 824.67$ sq. ft., *Ans.*

3. $8.5 \times 4 \times 10.5 + \overline{8.5 \times 8.5} = 429.25$; 429.25 sq. ft., *Ans.*

4. $6.75 \times 3.1416 \times 22.5 + (\overline{6.75^2} \times .7854) = 512.9+$;
512.9 sq. ft., *Ans.*

5. $\$.25 \times (5 \times 6 \times 30 \div 9) = \$25$, *Ans.*

Art. 926.

3. $\overline{2.5^2} \times .7854 \times 8 = 39.27$; 39.27 cu. ft., *Ans.*

4. Area of base = 3.899 sq. ft.
$(\$2.50 \times 3.897 \times 9) \div 3 = \$29.23$, *Ans.*

5. $\sqrt{130^2 - (40^2 + 30^2)} = 120$, alt. of pyramid.
$\sqrt{120^2 + 40^2} = 126.49$, slant height of end.
$\sqrt{120^2 + 30^2} = 123.69$, " " side.
$80 \times 60 \times 120 \div 3 = 192000$; 192000 cu. ft., vol., *Ans.*

$\overline{60 + 60} \times 126.49 \div 2 = 7589.4$, surface of ends.
$\overline{80 + 80} \times 123.69 \div 2 = 9895.2$, " sides.
$80 \times 60 = 4800$ " base.
22284.6 ; 22284.6 sq. ft., surface.

Art. 927.

2. $\overline{30+16}\times 7.5=345$; 345 square feet, *Ans.*

3. $(\overline{8\times 7}+\overline{4\times 7})\times 27.5\div 9=256\frac{2}{3}$; $256\frac{2}{3}$ sq. yd., *Ans.*

Art. 928.

2. $[(4^2\times .7854)+(3^2\times .7854)+$
$\sqrt{(4^2\times .7854)\times(3^2\times .7854)}]\times 2=58.1196$;
58.1196 cubic in, *Ans.*

3. $(\overline{1.25\times 1.25}+\overline{1\times 1}+\sqrt{1.25^2\times 1^2})\times 10=38.125$;
38.125 cubic feet, *Ans.*

4. 5 ft. $\div$ 3.1416 = 1.5917 ft. diameter of lower base.
3 ft. $\div$ 3.1416 = .95502 ft. " upper "
$1.5917\times 5\div 4=1.989625$, area of lower base in sq. ft.
$95502\times 3\div 4=.716265$ " upper " "
$\sqrt{1.989625\times .716265}=1.1935$;
$(1.989625+.716265+1.1935)\times\overline{50\div 3}=64.9898$;
64.9898 cubic feet, *Ans.*

Art. 932.

2. 3 ft. $\times$ 3.1416 $\times$ 9.4248 feet, circumference.
$9.4248\times 3=28.2744$; 28.2744 square feet, *Ans.*

3. 2 ft. $\times$ 3.1416 = 6.2832 feet, circumference.
$6.2832\times 2=12.5664$; 12.5664 square feet, *Ans.*

Art. 933.

2. $30\times 30\times 3.1416\times\overline{30\div 6}=14137.2$; 14137.2 cu. ft.

3. $10\times 10\times 3.1416\times\overline{10\div 6}=523.6$; 523.6 cu. yd., *Ans.*

Art. 934.

2. $\sqrt[3]{3000 \div (2 \times 3 \times 4)} = 5$; 2, 3, and 4 times 5 ft.; or 10 ft., 15 ft., and 20 ft. are the dimensions, *Ans.*

3. $\sqrt[3]{30720 \div (3 \times 4 \times 5)} = 8$; 3, 4, and 5 times 8 ft.; or 24 ft., 32 ft., and 40 ft., *Ans.*

Art. 936.

1. $\sqrt{1050 \div 6} = 13.2287+$, edge in feet, *Ans.*

$\overline{13.2287}^3 = 2315.03$, volume in cubic feet, *Ans.*

2. $\sqrt[3]{2150.42 \times 1250} = 139+$; 139 in. = 11 ft. 7 in., *Ans.*

3. $(\overline{7^2 \times .7854} + \overline{5^2 \times .7854} + \sqrt{(7^2 \times .7854) + (5^2 \times .7854)} \times \overline{7 \div 3} = 199.7534$, volume in cubic feet.

1728 cu. in. $\times$ 199.7534 $\div$ 231 cu. in. = 1494 gal., *Ans.*

4. $(1.25^2 + .5^2 + \sqrt{1.25^2 \times .5}) \times 8 = 19.5$, No. of cu. ft.

\$.28 $\times$ 19.5 = \$5.46, *Ans.*

5. $1728 \div (\frac{1}{2} \times \frac{1}{2} \times 1) = 6912$ in. = 576 ft., *Ans.*

6. 27 cu. ft. : 81 cu. ft. :: $10^2 : x^2$. (Art. ***910***, Prin. 2.)

$x = 17.32$, No. of inches, *Ans.*

7. There will be 12 times as many board feet as cubic feet.

$(\frac{1}{4})^2 + (\frac{1}{3})^2 + \sqrt{(\frac{1}{4})^2 \times (\frac{1}{3})^2 \times \overline{11 \div 3}} \times 12 = 40\frac{11}{36}$;

40 sq. ft. $7\frac{2}{3}$ sq. in., *Ans.*

8. $12^2 \times 6 = 864$, surface of cube, and also of sphere.

$12^3 = 1728$ cu. in. = 1 cu. ft., vol. of cube.

$\sqrt{864 \div 3.1416} = 16.58$, diameter of sphere.

$864 \times 16.58 \div 6 = 2387.52$;

2387.52 cu. in. = 1 cu. ft. 659.5 cu. in., vol. of sphere.

9. $4.5^3 : 9^3 :: 18$ oz. : x; $x = 144$ oz. $= 9$ lb., *Ans.*

10. $10 \times \overline{10 \times 3.1416} \times 10 \div 6 \div 2 \times 1728 \div 231 \div 6 =$ 326.4; 326.4 min. $=$ 5 hr. 26 min. 24 sec., *Ans.*

11. 75 hhd. $=$ 4725 gal. $=$ 1091475 cu. in. $=$ 631.64 cu. ft., contents of cistern.

$8^2 \times .7854 \times 1 = 50.2656$, No. of cu. ft. in cistern 1 ft. deep.

631.64 cu. ft. $\div$ 50.2656 cu. ft. $= 12.56$, No. of feet in depth, *Ans.*

12. $8^2 \times .7854 \times 4 \div 3 \times 1728 \div 2150.42 = 53.855$, No. of bushels, *Ans.*

Art. 937.

2. $21 + (\overline{30 - 21} \times \frac{8}{5}) = 27$;

$27^2 \times 40 \times .0034 = 99.144$, No. gal., *Ans.*

3. $26 + (\overline{31 - 26} \times .6) = 29$;

$29^2 \times 42 \times .0034 = 120.0948$, No. gal., *Ans.*